

# **VIRGINIA STOCKED TROUT MANAGEMENT PLAN (2016-2025)**



## EXECUTIVE SUMMARY

Trout fishing provides significant opportunities for outdoor recreation in Virginia. About one out of every seven hours spent fishing by Virginians is spent in pursuit of trout. Only Largemouth Bass and Smallmouth Bass receive more attention from anglers. Due to Virginia's warm climate, trout thrive year around only in higher-elevation mountain streams and in cold river tailwaters below a few large dams, such as the Jackson River and the Smith River. Consequently, 80% of the trout fishing in Virginia depends upon the more than one million catchable-size trout stocked annually by Virginia Department of Game and Inland Fisheries (VDGIF). Approximately 100,000 anglers fish for these stocked trout in Virginia each year in more than 180 streams and lakes stocked by VDGIF.

Due to the importance of trout fishing in Virginia, and the significant investment required to operate and maintain hatcheries to produce catchable-sized trout (generally greater length than seven inches, but frequently 10-12 inches), VDGIF developed the Virginia Stocked Trout Management Plan (heretofore referred to as the "Plan") to ensure effective and efficient management of trout fisheries over the next 10 years. Following a process similar to those used to develop statewide management plans for white-tailed deer, black bear, and wild turkey, the Virginia Stocked Trout Management Plan is designed to embody the interests of all Virginians who care about trout fishing (stakeholders). The planning process focused on balancing stakeholder values and sound biological information provided by VDGIF to produce a plan that is technically sound and publicly supported. The Plan includes values and goals defined by stakeholders to determine what Virginians want the stocked trout program to achieve and objectives and strategies, primarily developed by VDGIF technical staff, to describe how the goals and objectives can be achieved.

A stakeholder advisory committee, composed of 11 individuals representing the diverse interests of Virginians in management of stocked trout, worked closely with VDGIF and Virginia Tech personnel to develop the Plan. A technical committee that included VDGIF fisheries biologists, hatchery personnel and conservation police officers provided the technical aspects of the Plan. Virginia Tech personnel facilitated meetings of the stakeholder advisory, and technical committees, and helped with editing and formatting of the Plan.

The Plan contains two major sections: the technical section and the goals, objectives and strategies for management of stocked trout. The technical section describes the history of trout management in Virginia, how VDGIF approaches management of stocked trout, including production, facilities, the species produced, and challenges faced in raising trout. The second section of the Plan lists the values and goals for management of stocked trout within five major issue areas (what stakeholders want to achieve and why) and the objectives and strategies for management of stocked trout (specific accomplishments that will allow VDGIF to measure success in achieving goals and how to approach achieving goals and objectives). The Plan is designed to provide a blueprint for future directions for the stocked trout management program rather than specific details of day-to-day operations.

The issue areas and associated goal statements are as follows:

- Announcement of stockings. Goal: Announce stockings using a variety of strategies (including prior announcement, post-stocking announcement, or no announcement) to provide equitable access to the resource and to address the diverse preferences of trout anglers. In addition to existing Heritage Day events, some stockings will be announced in advance to allow anglers to plan fishing trips to coincide with known stockings. Other stockings will be announced at the end of the day when stocking occurs to reduce crowding and ensure the safety of anglers and VDGIF personnel involved with stocking.
- Angler recruitment and retention. Goal: Inform and educate existing and potential future anglers, recruit younger and more diverse anglers, and retain those already engaged through new promotion efforts.
- Funding and administration. Goal: Maintain a productive and adequately funded stocked trout program, including investigation of alternative funding and resource mechanisms to meet current and anticipated future demands. Maintain an open and transparent decision-making process regarding stocked trout management.
- Ecosystem effects. Goal: Manage trout stocking to optimize recreational opportunities while minimizing adverse impacts on aquatic and surrounding habitats, wild trout populations(including native brook trout) and other aquatic species. Manage habitat in stocked trout waters and preserve the aesthetics of the angling experience.
- Recreational opportunities. Goal: Provide a diversity of stocked trout fishing experiences designed to meet diverse angler preferences, and increase participation. Improve access to stocked trout waters for all anglers

VDGIF encourages anyone with an interest in trout fishing to comment on this draft management plan. Interested individuals can submit comments through a link on the VDGIF web page at <http://www.dgif.virginia.gov/fishing/trout/management-plan/> or mail to:

Stocked Trout Management c/o Vic DiCenzo  
Dept. of Fish and Wildlife Conservation (MC 0321)  
Virginia Tech, 310 West Campus Drive  
Blacksburg, VA 24061

Public meetings will be held in various locations throughout Virginia in September-October 2015 to present the plan and seek public input. Dates and specific locations will be posted on the VDGIF web page and publicized in local media.

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## INTRODUCTION

The Virginia Department of Game and Inland Fisheries (VDGIF) stocks more than 1 million catchable-size trout annually to support trout fisheries in more than 180 streams and lakes. Approximately 100,000 anglers fish for these stocked trout in Virginia each year. Trout anglers have a wide variety of motives for fishing, and their divergent values and opinions about how stocked trout fisheries should be managed create complex challenges for VDGIF. The Virginia Stocked Trout Management Plan is designed to inform interested individuals about the Stocked Trout Program, including the resources and infrastructure needed to attain the goals, objectives, and strategies for managing stocked trout fisheries described in the Plan.

Trout have always been a favorite of Virginia anglers. In 2011, approximately 14% of all freshwater fishing effort in Virginia targeted trout (USFWS 2011). According to the agency's most recent statewide angler survey (2009), trout are the second most sought after species behind black bass. Stocked trout provide recreational fishing opportunities in many areas of Virginia where natural recreational fisheries are limited, and these fisheries make important economic contributions to localities where they are created.

"Stocked trout" are hatched and/or reared in captivity and then released into a wild environment. A "designated stocked trout water" is defined as a water body where catchable-size trout are stocked by VDGIF, and a Virginia trout license is required to fish October 1 through June 15. "Catchable-size" is defined as  $>7$ ", although VDGIF targets trout 10-12" in length.

VDGIF, under the direction of a Governor-appointed Board of Directors, is charged specifically by the General Assembly with management of the state's freshwater fisheries resources. The Code of Virginia expresses many legal mandates for the Board and VDGIF, including management of wildlife species (29.1-103), public education (29.1-109), law enforcement (29.1-109), and regulations (29.1-501). To help clarify and interpret the role of VDGIF in managing wildlife in Virginia, the Board of Directors has adopted the following Agency mission statement:

*To manage Virginia's wildlife and inland fish to maintain optimum populations of all species to serve the needs of the Commonwealth; To provide opportunity for all to enjoy wildlife, inland fish, boating and related outdoor recreation and to work diligently to safeguard the rights of the people to hunt, fish, and harvest game as provided for in the Constitution of Virginia; To promote safety for persons and property in connection with boating, hunting, and fishing; To provide educational outreach programs and materials that foster an awareness of and appreciation for Virginia's fish and wildlife resources, their habitats, and hunting, fishing, and boating opportunities.*

## **What is the Virginia Stocked Trout Management Plan?**

The Virginia Stocked Trout Management Plan is the first comprehensive plan developed for stocked trout in Virginia. It summarizes the history of trout stocking and fishing in Virginia and provides a blueprint for future management directions. The plan establishes a framework of what needs to be done for stocked trout management, how it should be done, and when it should be done through 2025. By clarifying management goals and objectives of VDGIF relating to stocked trout, the Plan will help Board members, VDGIF administrators, VDGIF staff, and the public to effectively address stocked trout management issues. As the basis for guiding stocked trout management activities, decisions, and projects, the Plan will also serve to inform the General Assembly and the public of what VDGIF hopes to accomplish. The Virginia Stocked Trout Management Plan is a strategic plan that is intended to provide overall directions, goals, and objectives for the stocked trout program (e.g., to increase youth participation in stocked trout fishing). As such, it is not an operational plan where specific details of potential strategies to carryout objectives are exactly described (e.g., detailed descriptions of programs designed to increase youth participation).

## **How the Plan was Developed?**

Following the philosophy that guided the development of Virginia's Deer, Bear, and Turkey Management Plans, the Virginia Stocked Trout Management Plan was developed to represent the interests of all Virginians interested in stocked trout management. VDGIF collaborated with Virginia Tech's Department of Fish and Wildlife Conservation to implement the public and technical processes for plan development. During the planning process, public stakeholders focused on the values that are important in establishing goals for management of stocked trout, whereas fisheries management professionals focused on the technical aspects of how to attain the goals of stocked trout management.

To identify important issues in stocked trout management, ten public meetings were conducted throughout Virginia to begin the planning process. Approximately 150 Virginians attended the public meetings from October 2013 through February 2014. The issues identified by public meeting participants provided a starting point for Stakeholder Advisory Committee (SAC) discussions.

The SAC, composed of 11 Virginia citizens representing the diverse interests in stocked trout fishing (including key stakeholder groups, Appendix A), was tasked with identifying important values related to stocked trout fishing and developing draft goals to address those values. The SAC members represented various interests from across the western part of the state, including public landowners, sporting interests, non-consumptive interests, and conservationists. The SAC met four times between December 2014 and May 2015 to assist VDGIF in developing the plan.

A Stocked Trout Technical Advisory Committee (Technical Committee), composed of VDGIF biologists, hatchery staff, and conservation police officers with expertise in stocked trout management, provided scientific information and technical feedback to the SAC (Appendix B). Specifically, the Technical Committee drafted and presented the technical background

information on stocked trout production and management in Virginia, refined the values and goals developed by the SAC, identified the objectives and potential strategies to achieve the SAC's draft goals, and drafted the final plan (e.g., writing, compiling technical sections with SAC input).

Faculty and graduate students from Virginia Tech's Department of Fish and Wildlife Conservation provided the overall guidance and administrative support for the planning approach and processes. Virginia Tech personnel facilitated planning meetings (e.g., public meetings, meetings of the SAC and Technical Committee, regional public input) and also provided other administrative and logistical support (e.g., drafted meeting notes, communication and mailings, fiscal needs).

### **Plan Format**

The Plan includes sections relating to the management of stocked trout, angler surveys conducted by Virginia Tech from 2013–2015, and hatchery production of stocked trout in Virginia. Within the context of VDGIF's mission statement, the SAC described five major issues related to management of stocked trout and developed goals for each of those five issues. The major issue areas included stocking announcements, recruitment and retention of trout anglers, funding and administration for the stocked trout program, ecosystem effects of stocking trout, and recreational opportunities. The Plan lists specific objectives designed to attain the goals, and suggests strategies clarifying how each objective might be achieved.

### **Interim Changes to the Plan**

The Plan is designed to provide guidance and priorities to help manage Virginia's stocked trout program through 2025. Issues and public values related to stocked trout fishing should not change dramatically over the 10-year period. However, a plan should be a dynamic and flexible tool that remains responsive to changing social, environmental, technical, and administrative conditions. To keep the Plan relevant and responsive to the programmatic goal directions provided by the public, specific objectives and strategies may be added, deleted, or amended by VDGIF as circumstances demand. As adaptive changes in management approaches (i.e., objectives) are necessary, VDGIF will submit interim updates to the SAC for review before implementing changes; updated objectives will be provided as addenda to the Plan on VDGIF's website.

### **Acknowledgements**

The thoughtful involvement of many Virginia stakeholders at public meetings and through written comments was crucial to the successful representation of the stocked trout-related interests and public values of all citizens. The major commitment of time and expense, unselfish dedication, and enthusiasm provided by members of the SAC not only made a substantial difference in the quality of the final plan, but also enriched the process throughout. We greatly appreciate their effort and dedication. While also grasping technical realities of



stocked trout management, it was no small task to conscientiously struggle with balancing the varied public desires.

The Technical Committee reviewed and summarized technical information about Virginia's stocked trout management program. Technical research and writing for the Plan primarily was provided by Steve Reeser (VDGIF), Nate Wilke (VDGIF), Dr. Steve McMullin (Virginia Tech), Vic DiCenzo (Virginia Tech), and Amanda Hyman (Virginia Tech).

We also greatly appreciate the planning-process support provided by Virginia Tech's Department of Fish and Wildlife Conservation. Dr. Steve McMullin, Vic DiCenzo, and Amanda Hyman all played key roles to ensure the successful and timely completion of the entire planning effort. Through processes that integrated public values with professional technical knowledge, Dr. McMullin's vision has guided numerous VDGIF management planning efforts since 1999.

## PROGRAM DESCRIPTION

### MANAGEMENT

There is no such person as an “average” stocked trout angler in Virginia. If you asked ten different stocked trout anglers what they would like to see in VDGIF’s Stocked Trout Program, you would most likely get a wide variety of answers. Stocking hatchery-reared trout into a stream or small impoundment is completely artificial, and therefore can be manipulated in many ways. Where and when trout are stocked, the size and number of fish stocked, and how and when anglers are informed of trout stocking are management options that VDGIF utilizes in its stocked trout program. VDGIF has been responsive to the requests of Virginia’s stocked trout anglers. Over the past three decades, the Department has made changes to the general put-and-take program and initiated several programs to meet the social and demographic needs of the stocked trout angling community.

### History of Trout Stocking in Virginia



By the early 20<sup>th</sup> century, stream and river ecosystems in the eastern U.S. had become severely degraded. Extensive logging, mining, dam construction, and other human impacts impaired water quality and stream bottom conditions to the point that trout could no longer reproduce or even exist in many waters. Outstanding recreational fisheries declined or vanished. Early pioneers in fish and wildlife conservation focused on stocking hatchery fish to rebuild wild populations and in many cases to provide “instant” recreation. One of the most successfully propagated fishes proved to be trout. Trout were raised to adult size on artificial feed more easily than other species. Anglers embraced the concept of stocking fish of legal harvest size. For these reasons, hatchery trout were stocked in coldwater streams to augment fisheries where wild trout populations declined or had disappeared entirely. They were also introduced to water bodies where they had not previously existed, such as warmwater environments where they could survive only during colder months.

VDGIF first stocked hatchery rainbow and brook trout in Virginia streams in the late 1920s. Some of the first streams to be stocked were located in the newly formed Shenandoah National Park. Initially, VDGIF operated two trout hatcheries: Marion Hatchery (Smyth County) was VDGIF's first trout hatchery opening in 1930, and Montebello Hatchery (Nelson County) began operating in 1931. Coursey Springs Fish Culture Station in Bath County was added to VDGIF's hatchery system in 1964. The U.S. Fish and Wildlife Service began operating federal trout hatcheries at Paint Bank (Giles County) and Wytheville (Wythe County) in the 1960s. While under federal management, trout from these two facilities were stocked only in waters located within the George Washington and Jefferson National Forests. Both Paint Bank and Wytheville hatcheries were acquired by VDGIF in the 1980s. At the request of anglers and to provide more diverse fisheries, VDGIF began stocking Brown Trout in 1961.

In 1958, Virginia became one of the first states to require a separate license to fish for stocked trout. The revenue from the trout license was dedicated solely toward production of hatchery trout. Historically, trout were stocked only where the public had fishing access, accessibility for stocking was adequate, and water quality and temperature were suitable for trout throughout most of the year. A signed agreement between private landowners and VDGIF to allow public access was required before trout were stocked in waters on private lands. Larger impoundments were excluded from the program because VDGIF hatcheries could not produce enough trout to sustain a desirable fishery. In the early years of the program, stocking focused mostly on streams, with about 130-150 waters receiving trout. The number of waters stocked by VDGIF peaked in the 1970s at close to 240, located across forty counties primarily in the western and southwestern portion of the Commonwealth.

A statewide inventory of coldwater streams was conducted by VDGIF in the late 1970s. The purpose of this project was to identify and classify all wild trout populations. Many streams being stocked with hatchery trout were found to harbor exceptional wild trout populations. For this reason, stocking trout was discontinued in many streams in the early 1980s. More waters were added when the Delayed Harvest and Urban Trout programs were introduced in the 1990s. The number of waters stocked by the Department has ranged from 175-195 over the last three decades.

## **Trout Fishing Season**

Virginia's trout season had an "Opening Day" from the 1930s until 1995. Opening Day fluctuated between the last Saturday in March and the first Saturday in April with fishing beginning at a designated time in the morning. Trout season ran from opening day to December 31 (the majority of stocked trout waters would not support trout from June-September due to high water temperatures). Stocked trout waters were closed to fishing up to three months before opening day, and trout were stocked during this "pre-season" period. Historically, most waters received three stockings (one pre-season, and two in-season). Additional two-week, in-season closures of stocked waters preceded post-opening day, in-season stockings. Different regions of western Virginia were closed to trout fishing for in-season stockings at different times so that some trout waters were always open to fishing. Select waters were stocked as late as June and some waters received a single fall stocking in October. Statewide surveys of trout license buyers in 1986 and 1993 indicated support for transitioning to a year-round trout season increased from

58% to 75%. Citing the support of a year-round season, opening day was discontinued in 1996. Currently, trout stocking occurs from October 1 through May 31, and there is no closed season.

## **Regulations**

In the early years of the program, daily creel limits were fairly liberal, allowing anglers to harvest up to 12 trout. Over time, the creel limit was reduced incrementally to the current limit of six trout per day. To provide equity and ensure a sporting ethic, anglers are only permitted to fish with one rod and during daylight hours in stocked trout waters.

## **Law Enforcement**

As the title of “Game Warden” evolved to “Conservation Police Officer (CPO),” so did the diversity of the Stocked Trout Program. Prior to 1996 when trout were stocked prior to opening day, CPOs spent day and night patrolling streams and lakes ensuring that poachers would not steal the opportunity of the ethical fishermen who waited with family and friends for this special day. This law enforcement effort was significant, as many of these waters were stocked and then closed to angling for several weeks. During the “Opening Day” era, special operations on trout streams were conducted by law enforcement officials, bringing CPOs from eastern Virginia to the western counties. One significant hurdle for law enforcement came with the Fair Labor Standards Act (FLSA). This prevented CPOs from working extended hours that they were not compensated for and made them unavailable except during approved overtime.

CPOs deal with traffic issues as some anglers followed the trout truck from hatcheries to stocking locations. While the need to watch streams in the old pre-season period no longer exists, CPOs currently assist with stocking events, provide traffic control, gather information for biologists, and enforce laws and regulations. The most frequent violations on trout streams are fishing after obtaining the daily limit, exceeding creel limits, snagging, littering, and fishing without proper licenses. CPOs’ contact with anglers ensures they are properly licensed and obey creel and size limits. These contacts vary from a thank you to a warning, summons, or arrest. CPOs are the primary field representatives for VDGIF and thus have extensive contact with trout anglers. Anglers are quick to let the CPOs know how they feel about the quality of VDGIF’s trout stocking program.

## **Trends in Participation**

Prior to 1996, when “Opening Day” was preceded by a season closure and a large pre-season stocking emphasis, large numbers of anglers fished for stocked trout. Conflicts between anglers and landowners over the years led to a decline in private waters available for public-stocked-trout fishing. In order to address issues related to large opening day crowds (e.g., litter, traffic congestion), the trout program shifted to a year-round season with the hope of reducing crowding on the waters and better utilizing limited hatchery space. Trout-angler surveys (2001 and 2008) conducted since the creation of the year-round season have found close to 80% of

trout anglers prefer not having an opening day and approximately 70% of surveyed anglers rate the current program as Excellent/Good.

Sales of annual trout licenses declined from over 100,000 per year in the mid-1990s to fewer than 60,000 in recent years. When lifetime fishing license sales are included, the total number of licensed trout anglers appears to have remained relatively constant since the initial peak of sales (Figure 1.) However, DGIF has no way to determine how many lifetime license holders continue to fish for stocked trout.

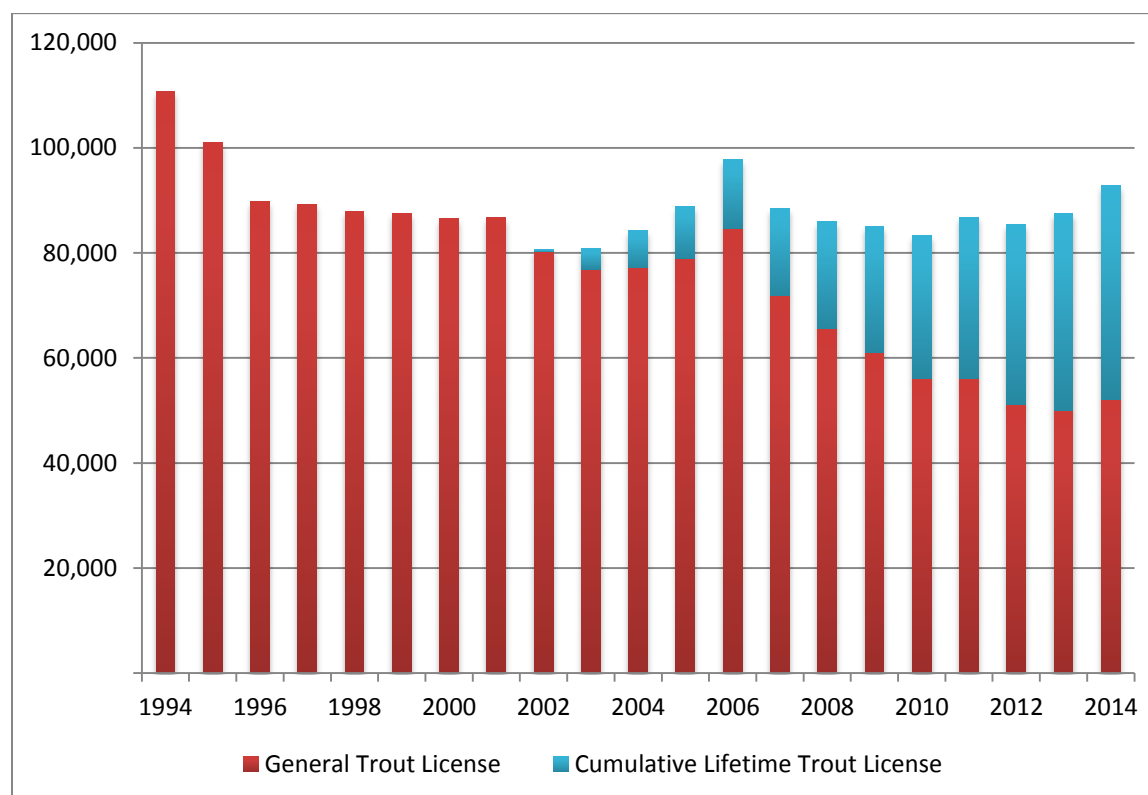


Figure 1. Trout license sales combined with Lifetime Fishing License Sales

## Funding

Virginia's regulations require anglers fishing for stocked trout in designated stocked trout waters to purchase a trout license in addition to a regular freshwater fishing license. The intent of the separate trout license was to financially support hatchery trout production (essentially considered a "pay to participate" program). While all revenue from trout license sales goes directly toward catchable trout production, these revenues alone do not support the entire program. However, 64% of trout anglers surveyed in 2008 stated that they purchased a basic freshwater fishing license primarily to fish for trout. If those additional basic freshwater fishing license sales are added to trout license sales, the funds generated nearly meet the needs of the hatchery system, which in 2014 amounted to approximately \$2.4 million. This figure does not

include costs associated with VDGIF's management staff or law enforcement activities associated with the stocked trout program.

### **Catchable Trout (Designated Stocked Trout Waters)**

The catchable trout stocking program is the most popular component of VDGIF's trout program and accounts for approximately 80% of trout angling effort in Virginia. Roughly 1.2 million catchable trout (600,000 pounds) are stocked into 135 streams and 32 ponds and lakes (204 different stream sections and impoundments) for the 100,000 anglers that pursue them (Figure 2). "Designated Stocked Trout Waters" include waters stocked with catchable-size trout and are listed by the agency Director in the Annual Trout Stocking Plan. Stocked catchable-size trout support general Put-and-Take, Delayed Harvest, Urban, Fee Area, and Trout Heritage fisheries. These waters are considered designated stocked trout waters, which only require a trout license from October 1 through June 15. All catchable-size stocked trout are at least seven inches in length when stocked. However, 10 ½ inches (0.45 lb.) is the desired size trout that VDGIF tries to produce.

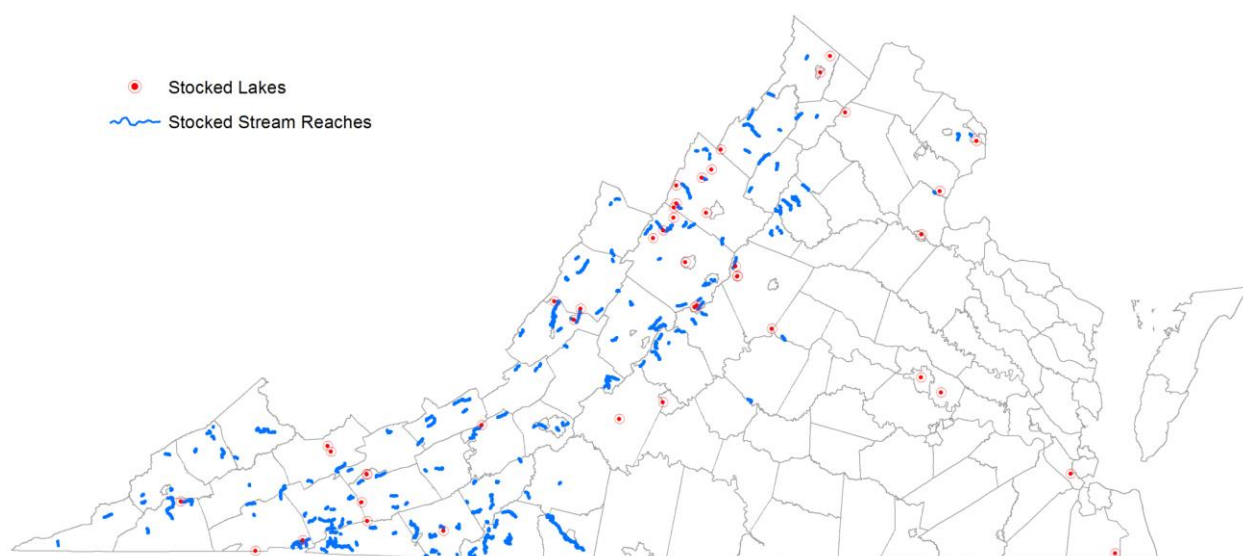


Figure 2. Location of waters listed in the 2015 Catchable Trout Stocking Plan.

### **General Put-and-Take Waters**

Put-and-take stocked trout fishing draws the most interest and attention from anglers probably because of the availability of catchable-size trout, liberal gear restrictions, and ease of capture. Eighty-nine percent of the waters stocked with catchable-size trout currently fall under the put-and-take category.

## **Delayed Harvest Waters**

The delayed harvest program was launched in 1989. The intent of this program is to incorporate aspects of both catch-and-release and put-and-take trout fishing. Streams in this program are generally large and provide good trout habitat. However, water temperature often limits trout survival through the summer months. Catchable-size trout are stocked typically once in fall, once in winter, and once in spring. From October 1 through the following May 31, only artificial lures may be used, and all fish must be released unharmed. From June 1 through September 30, general trout regulations are in effect, and trout may be creel. A trout license is required to fish these waters from October 1 through June 15. There are currently 14 streams in the delayed harvest program (Figure 3).

## **Urban Waters**

In 1993, VDGIF initiated its Urban Fishing Program at three ponds in urban and suburban areas. These three prototypes evolved into seven permanent sites across the Commonwealth (Figure 3) over the following 15 years: Cook Lake (Alexandria), Locust Shade Park Lake (Prince William), Dorey Park Lake (Henrico), Shield Lake (Richmond), Lake Biggins (Newport News), Northwest River Park Lake (Chesapeake), and the newest, Old Cossey Pond (Fredericksburg). Due to site logistics and issues, waters may be added or dropped from the program from time to time. The sites share common components – they are small ponds managed by their localities (Parks and Recreation Departments) and lie within the “urban crescent,” which extends south from the Washington, DC metro area through Richmond then east to Virginia Beach.

The motivation for this program is to bring angling to densely populated areas, and give urban residents an opportunity they may not otherwise have. Currently, all urban fishing program sites are stocked with catchable Rainbow and Brown Trout five times per season (November – April) at an annual rate of approximately 1200 fish per acre. There were originally ten trout stockings during the season (one stocking about every 2.5 weeks which was determined to be the appropriate frequency as a compromise between attaining target catch rate of one fish per hour and hatchery-hauling constraints). Considering available resources, stockings were reduced years ago. Currently, there are five trout stockings per season (more fish per stocking, but less frequent stocking events). Urban waters that can accommodate catfish are also stocked with large Channel Catfish during warmer months when water temperatures are too high for trout.

The Urban Trout Program generated heavy fishing participation, estimated at 12,500 angling hours per acre annually in the mid-2000s with 36 acres of water in the program. Average catch rate was around 0.5 fish per hour, which, for these fisheries, is considered high relative to national catch estimates due to intense fishing pressure. The Urban Trout Program may serve to attract new anglers, as past surveys indicated 5% of users had fished for less than one year, and 19% had fished for less than five years. Juvenile usage comprised 15-20% of the total with a much of the remainder made up of senior citizens.

## Fee-Fishing Areas

The fee-fishing, or “pay-as-you-go” trout program, began in 1964 when the Clinch Mountain Fee Fishing Area opened. Today, VDGIF manages three fee-fishing areas located in western Virginia: Clinch Mountain, Crooked Creek, and the Douthat Lake Fee Fishing Areas (Figure 3). The primary goal of the fee fishing program was to provide inexpensive trout fishing opportunities for vacationers, both resident and non-resident. Today, these areas also provide anglers an opportunity to experience a more traditional “opening day” as well as to fish for frequently stocked trout throughout the season. During the fee season, anglers may fish one of the fee areas with a basic freshwater fishing license and a daily fishing permit (\$8) which is required of all anglers over the age of 13. Children 12 and under may fish without a permit as long as they are accompanied by a licensed adult, and the combined creel does not exceed that of the adult (6 trout, 7” minimum length). Revenue generated from the daily permit sales are used to offset the cost of trout production and stocking at the fee areas. Except for opening day at these fee-fishing areas, which begins at 9:00 am on the first Saturday in April, fishing begins at 5:00 am and ends one hour after sunset. Fee areas are closed to fishing five days prior to opening day. Outside of the fee season, these areas revert to designated stocked trout waters, and a trout license is required instead of a daily permit. A daily permit is required to fish the Clinch Mountain and Crooked Creek fee areas from the first Saturday in April through September 30. Douthat Lake Fee Fishing Area requires a daily permit from the first Saturday in April through June 15 and from September 15 through October 31.

Clinch Mountain Fee Fishing Area is located in southwest Virginia about 7 miles west of Saltville. The area consists of approximately 7 miles of Big Tumbling Creek and its two major tributaries, Briar Cove Creek and Laurel Bed Creek. Trout are stocked four times a week during the fee season. Outside of the fee season, the area is managed as designated stocked trout waters to the gate at the foot of the mountain.

Crooked Creek Fee Fishing Area is located in Carroll County about 5 miles east of Galax. This area consists of a 5-mile stocked section and a 2-mile section managed as a wild trout fishery. Trout are stocked four times a week during the fee season.

Douthat Lake Fee Fishing Area is located in Bath County and lies within Douthat State Park. This area includes Douthat State Park Lake (60 acres) and 4 miles of Wilson Creek: above the lake to the park boundary and downstream to the lower boundary with U.S. Forest Service land. Trout are stocked twice per week throughout the fee period. Outside of the fee season, the area is managed as designated stocked trout waters.

Anglers who visited VDGIF’s fee areas purchased 17,379 permits in 2014. Participation declined from the 1970s when 37,022 permits were sold at the Clinch Mountain Fee Fishing Area alone in 1973. Part of the decline in permit sales can be attributed to the substantial increase in trout fishing opportunities, which began in 1983 through the elimination of the May closure and increased numbers of in-season trout stocking on general stocked waters. Additionally, the cost of the daily permit increased from \$1 to \$8. Although the number of annual permit sales declined, the program remains popular with anglers and provides a quality



experience for catchable stocked trout, particularly through the summer after stocking has ceased on the general designated trout waters.

### Trout Heritage Day

Heritage Day began in 2001, to provide a similar experience to opening day for those anglers who enjoyed the excitement and social aspect of the opening day of trout season. Select waters are stocked prior to or on the first Saturday in April to create an announced stocking event. These streams and impoundments are closed to fishing the Friday prior to the first Saturday in April for stocking, and reopen to fishing the following day at 9:00 am. The stocking for Heritage Day counts as one of the standard allocated stockings for that water. There were 20 Trout Heritage waters in 2015 (Figure 3).

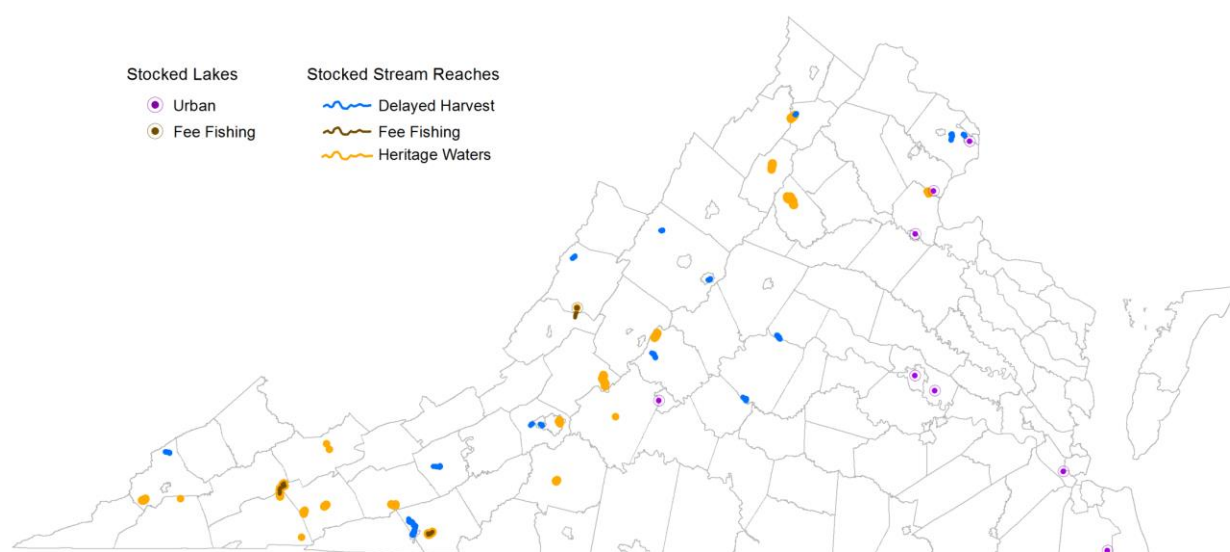


Figure 3. Location of Delayed Harvest, Fee Fishing, Urban, and Trout Heritage stocked waters.

### Kids Fishing Events

VDGIF provides stocked trout for children-only fishing events. This program is extremely popular, as thousands of children participate in these events. Events are held on both streams and impoundments, and must occur on VDGIF-designated stocked trout waters during the stocking season (October 1 – May 31). The stocking for the event counts as one of the standard allocated stockings for that particular water. VDGIF only provides trout for one event per water body per year. Waters scheduled for the event may be closed by the managing sponsor or landowner for one day prior to the event. Events can only be for one day and must conclude no later than 4:00 pm, at which time the designated stocked water opens to all licensed anglers. VDGIF stocked trout for 29 children's fishing events in 2015. Currently all children-only events are held on weekend days.

**How is the amount of trout stocked determined?**

In the “Opening Day” era, trout stocking densities were determined primarily by fishing pressure. Biologists and Game Wardens counted anglers on designated stocked trout waters on Opening Day, and those numbers were used to generate the stocking allocation for those waters the following year. Depending on the water being stocked, 3-4 trout were stocked per angler. Currently, biologists use a formula where stream width, fishing pressure, physical habitat, food availability, and stocking distribution are rated to determine the amount of trout to be stocked.

**STREAMS:****WEIGHTING FACTOR****A. Stream Width**

15'	1
15-30'	2
30-50'	3
50'+	4

**B. Fishing Pressure**

Light	0
Moderate	1
Heavy	2

**C. Physical Habitat**

<u>Poor/fair:</u> (< 20% pools, shallow (<3') Limited cover, could have frequent low Flow problems)	0
<u>Good:</u> (20-35% pools – some with good Depth (>3') and cover – good flow except During severe drought)	1
<u>Excellent:</u> (>35% pools – most with good Depth (>3') and abundant overhead cover- Very dependable flow)	2

**D. Food Availability/Holdover potential**

<u>Poor:</u> (very sterile, often acidic, little food, instream cover very limited, water quality or temperature problems)	0
<u>Average:</u> (adequate food, water quality and cover for seasonal holdover)	1

Excellent: (abundance of food, good cover, summer holdover potential – often spring-fed) 2

### E. Distribution Potential

<u>Limited:</u> (few sites available (>1/4 mi between stocking points))	0
---	---

Adequate: (stocking sites limited, but at least 1 every ¼ mi) 1

Excellent: (can stock at almost any point) 2

How to determine number of fish stock per mile per stocking for streams: \*\*

- add all weighting factors
- multiply weighting factor by 50 for total trout per mile
- multiply by total miles of available stream for per stocking allocation
- on approved urban streams, multiply weighting factor by 75\*\*\*

**IMPOUNDMENTS:**

### A. Size

### Standard Stocking Rate

< 5 acres	175/acre
6-10 acres	100/acre
10-25 acres	50/acre
> 25 acres	40/acre

### B. Fishing Pressure

### Weighting Factor

Light	0.5
Moderate	0.75
Heavy	1.0

Multiply the fishing pressure factor by the recommended stocking rate to get number per acre for each stocking.

Currently, VDGIF stocks trout by pounds rather than number. The amount of pounds is converted from the number allocated for each site. Thus, the number of fish stocked may fluctuate among stockings at each site based on the average size of individual fish.

### **How is the frequency of stocking determined?**

General put-and-take stocked trout waters are classified as A, B, or C. This classification determines how many times the water will be stocked and within what time period.

*Category A:* Waters have consistently suitable flow and temperature conditions for survival of trout from October 1 through June 15. The waters provide good depth, cover and food for survival of holdover stocked trout. Streams where fall stocking is frequently delayed or canceled due to low flow conditions generally are not considered Category A waters. Stocked eight times between October 1 and May 30.

*Category B:* Waters have consistently suitable conditions for holding stocked trout from November 1 through May 31. Waters generally provide good size, depth and cover to provide a quality angling experience under normal flow conditions. Waters provide adequate conditions for survival of stocked trout through the stocking season. Stocked five times between October 1 and May 15.

*Category C:* Generally very small streams or ponds that provide limited fishing opportunity and are only suitable for holding trout during very good flow conditions. Most of these waters are small, publicly owned streams that have been stocked historically and remain in the program. Stocked three times between October 1 and April 30.

Delayed Harvest waters are stocked three times between October 1 and May 30.

Urban Trout Waters are stocked five times between November 1 and April 15.

### **How is the species of trout stocked determined?**

#### *Rainbow Trout:*

- used in all lake and stream stockings, except where special conditions (see below) or specific management plans warrant other species.

#### *Brown Trout:*

- used only in stream situations or in two-story reservoirs
- used only when physical habitat and food availability is adequate
- should not be stocked where they could establish a wild population within a native brook trout drainage.
- will not be stocked where VDGIF aquatic biologists determine they would negatively impact populations of threatened or endangered non-game fishes.

*Brook Trout:*

- required where VDGIF stocks trout in areas with marginal wild brook trout populations
- recommended in lakes that are fed by streams that contain wild Brook Trout populations.
- recommended in streams with tributaries that contain wild Brook Trout populations.
- may be substituted for Rainbow Trout in most other situations

## **Triploid Trout**

Normal trout are “diploid”, meaning each individual fish has two pairs of chromosomes. Triploid trout have three pairs of chromosomes and are essentially sterile (cannot reproduce). How and where VDGIF produces triploid trout is discussed in the “Production” section of this document.

*Goal:* to stock triploid trout in waters where the genetic purity of the native trout species is to be protected, or where stocked trout natural reproduction is not desired.

*Objectives:* Annually produce adequate numbers of triploid rainbow, brook and Brown Trout to meet the Department’s needs.

*Use of Triploid Trout*

Priority:

- Watersheds with known populations of pure Southern Appalachian Brook Trout
- Streams originating within the boundaries of Shenandoah National Park.
- Waters with wild brook trout population present.\*
- Fingerlings in the put-n-grow program (streams and reservoirs).

\*Triploid Rainbow or Brown Trout can be stocked into brook trout only stocked trout waters when diploid brook trout are not available.

When all triploid allocation requests have been filled, surplus triploid trout can be substituted for diploid trout in any water where VDGIF is stocking trout.

## **How are trout stockings advertised to the public?**

Currently, all stockings in designated stocked trout waters are delay-announced, except for two instances: 1) waters in the Trout Heritage Program, which are pre-announced to be stocked for the first Saturday in April; and, 2) waters stocked for children-only fishing events. All other stockings are announced each day at approximately 4:00 pm on VDGIF’s website <http://www.dgif.virginia.gov/fishing/stock/> and on the Trout Stocking Line 434-525-FISH (3474). Waters stocked on Saturday may not be listed until the following Monday.

## What waters are stocked, and where are they located?

An updated list of Designated Stocked Trout Waters is located in the Virginia Freshwater Fishing and Watercraft Owner's Guide and on VDGIF's website. An interactive mapping application for stocked trout waters, special regulation waters, and wild trout waters is available by clicking on the link to stocked trout interactive map on VDGIF's website:

<http://www.dgif.virginia.gov/fishing/trout/> . Maps identifying locations of stocked trout waters may also be published in the Department's magazine *Virginia Wildlife*.

## Adding New Waters to the Catchable Trout Program

Ideal candidate waters for the Catchable Trout Stocking Program would be considered transition habitats between coldwater and warmwater communities. These waters, under natural conditions, provide limited recreational fishing but can provide excellent trout fishing opportunities on at least a seasonal basis. The following criteria should be used when adding waters to this program:

### *Habitat/Native Fauna:*

- Streams should not currently support a significant wild trout fishery or the potential for establishment of one. No Class I or Class II wild trout stream will be considered for the program, and Class III and Class IV waters will only be considered after careful evaluation of current angling potential and potential impact of stocking on resident populations.
- If waters are within the known range of Southern Appalachian strain brook trout, additional analysis of brook trout populations within the drainage may be necessary. Only triploid (sterile) trout should be stocked in watersheds known to contain Southern Appalachian strain brook trout.
- Waters to be considered should not support a significant warmwater population of gamefish.
- If waters contain a federal or state listed threatened or endangered species, an evaluation, in consultation with Bureau aquatic non-game biologists, must be made to determine potential effects on the species or its habitat. If it is determined that stocking may significantly affect that species, the water should not be added to the program.
- Only waters that will rate at least a Category B Catchable Trout fishery should be added. No lake over 20 acres in size should be considered for catchable trout stocking and streams should be between 15 and 75 feet in width.
- Streams should have at least 20% pool habitat with average pool depths of 3 feet or greater and should have adequate cover to retain trout in the stocked section.
- All waters should be capable of sustaining trout through June 30<sup>th</sup> and have adequate water quality that will not stress trout or cause substantial disease or mortality.

- Allocations for these waters must follow the approved trout stocking allocation guidelines

*Public Access:*

- The area must be accessible to the general public without payment of a fee for fishing. VDGIF will consider areas that charge a daily use fee to all users as long as the fee is not designed for profit but is used for maintenance of the facilities and area. The amount of the fee should be considered to determine if it is reasonable and that anglers would be willing to pay in order to access the area.
- The area must have adequate parking to avoid causing unsafe traffic hazards and must be open to anglers year-round.
- Streams should have a least one continuous miles of open water in order to be added to the program. VDGIF's general guideline for stocking streams is to not stock within 1/4 mile of posted property. If public water or natural barriers to fish migration are located at either end of a proposed section of water, the minimum length can be reduced accordingly. Posting of a very short section of water or posting of one side of the stream does not restrict consideration of a stream for the program as long as anglers can easily access the remaining section of stream or the opposite bank.
- Staff shall get signed landowner authorization on all new waters. VDGIF has an approved landowner public fishing agreement form available.

*Geographic Factors:*

- Generally, the catchable trout program will be limited to the traditional trout counties lying west of U.S. Highway 29 and abutting the Blue Ridge, except for the Urban Fishing Waters, and Delayed Harvest Waters, which are available statewide.
- VDGIF's goal is to retain, expand, and improve the program where possible. Therefore, additions to the catchable trout stocking program will be considered throughout the approved region without limiting numbers of waters by county or region. However, VDGIF will give higher priority to areas that have limited trout fishing opportunity and to areas that better serve high population densities. Additions to the program should be used to substitute for removal of undesirable waters where appropriate.

**Fingerling Stocking**

The fingerling stocking program is designed to take advantage of the natural potential of deep reservoirs, coldwater tailwaters, and spring-fed streams to produce quality trout fishing opportunities where wild trout fisheries are not possible due to the lack of natural reproduction. Because summer water temperatures are usually a limiting factor to trout survival, under this program a stream or reservoir must provide suitable, year-round water temperatures, have good habitat, and be productive enough to provide adequate food for good growth. VDGIF utilizes Brook, Rainbow, and Brown Trout in the fingerling program. The species utilized depends upon habitat conditions of the receiving water and specific management objectives. Suitable waters

are stocked once annually with fingerling or sub-catchable (smaller than the legal size limit of 7”) trout, and often length limits and angler gear restrictions are imposed to protect these sub-legal size fish until they reach harvestable size. In areas receiving heavy fishing pressure, special gear restrictions are often necessary to avoid high hooking mortality rates. These fish will often be caught several times before they eventually reach harvestable size. The program can only be successful if hooking mortality remains low. During this time, trout lose most of their hatchery characteristics, both in appearance and behavior, and create a fishery that approaches a wild one in terms of fishing experience. Some of Virginia’s most exciting trout fishing opportunities can be found within the fingerling stocking program. By stocking small fish once a year, a high-quality fishery can be developed at a fraction of the cost of the more common put-and-take program. During the 2013-14 stocking season VDGIF stocked approximately 305,000 fingerling trout in 22 different waters.

\*Some stream sections that receive fingerling trout are located entirely on private lands, and VDGIF manages these fisheries in cooperation with the private landowners using a permit system. A free permit is required to fish these streams and can be obtained from VDGIF’s website: <https://www3.dgif.virginia.gov/troutpermits/>. In 2014, approximately 5,600 permits were issued for the three streams in this program (Mossy Creek, Buffalo Creek, and South River).



**ANGLER SURVEYS: 2013-2015**

In July 2013, VDGIF initiated a study with Virginia Tech's Department of Fish and Wildlife Conservation to evaluate the stocked trout program. This research was designed to address the following questions:

1. How many stocked trout do anglers catch and harvest?
2. Are trout license sales declining, and if so, why?
3. What can be done to improve angler satisfaction with stocked trout fishing and management in Virginia?

To address the first question, researchers conducted creel surveys on 17 stocked trout waters across Virginia, interviewing anglers as they fished (Table 1 and Figure 4). These interviews provided information on how long anglers fished, the number of trout caught and harvested, as well as preferences and opinions regarding fishing for stocked trout. To address questions 2 and 3, researchers analyzed patterns in license sales and used two mail surveys to collect information from stocked trout anglers. To address question 2, researchers surveyed 1,100 anglers who had previously purchased trout licenses in 2012 and 2013 but did not purchase a trout license in 2014, asking questions about why they did not fish and if they planned to participate in the future. To address the question 3, researchers sent a different survey to 5,400 licensed trout anglers designed to better understand why anglers fish for stocked trout, what aspects of the program they prefer, and what drives their satisfaction. These research efforts significantly enhanced stakeholder input in development of the Plan.

Table 1. Sites at which researchers interviewed anglers during the 2013-2014 and 2014-2015 stocked-trout seasons. PNT denotes a Put-and-take fishery, while DH denotes a Delayed Harvest fishery.

Site	County	Stocking area (mi. or acres)	Type of Fishery	Class	Trout Species Stocked
Pandapas Pond	Montgomery	8	PNT	A	Rainbow
Roanoke River	Roanoke	2.38	DH	-	Rainbow & Brown
Big Stoney Creek	Giles	7.51	PNT	A	Rainbow
Whitetop Laurel Creek	Washington	5.61	PNT	A	Rainbow & Brown
Frying Pan Creek	Dickenson	4.95	PNT	C	Rainbow & Brown
Lincolnshire Lake	Tazewell	21	PNT	A	Rainbow & Brown
Locust Shade	Prince William	8	PNT	Urban	Rainbow & Brown
Dorey Park Lake	Henrico	5	PNT	Urban	Rainbow & Brown
Lake Thompson	Fauquier	10	PNT	A	Rainbow, Brown, & Brook
Mill Creek	Rockbridge	1	PNT	A	Rainbow, Brown, & Brook
Rose River	Madison	2.91	PNT	A	Rainbow & Brook

South River	Waynesboro City	1.33	DH	-	Rainbow, Brook, & Brown
South Fork Powell	Wise	2.36	PNT	A	Rainbow & Brown
Stock Creek	Scott	2.17	PNT	B	Rainbow
Liberty Lake	Bedford	1.8	PNT	A	Rainbow
North Creek	Botetourt	2.51	PNT	B	Rainbow and Brook
McFalls Creek	Botetourt	2.47	PNT	C	Rainbow

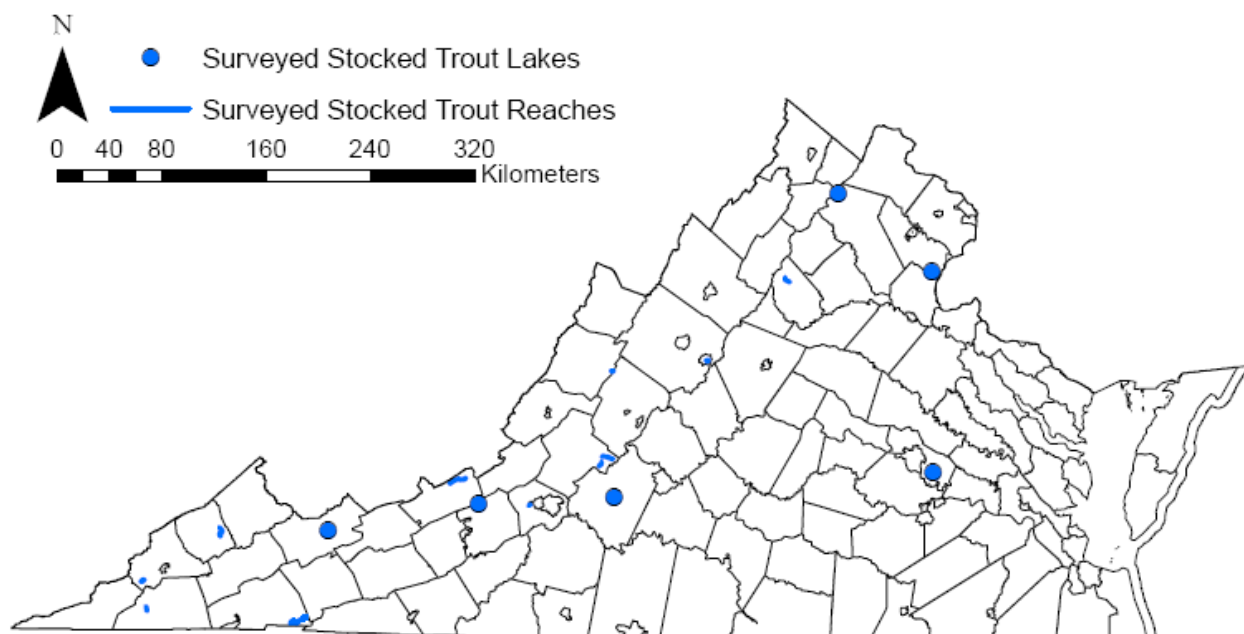


Figure 4. Location of trout streams and lakes where creel surveys were conducted.

### Angler Characteristics

Respondents to the on-site survey ranged in age from 18 to 91, with an average age of 48. Males comprised 92% of the respondents and most were either employed (55%) or retired (27%). The remainder of anglers were either students (6%), Unemployed (4%), disabled (3%), homemakers (1%), or did not respond (4%). Anglers fished for stocked trout in Virginia an average of 25 days per year, traveling, on average, approximately 24 miles one-way per trip. Over 57% of the anglers caught at least one fish, and averaged 1.2 trout per hour. Twenty-two percent of anglers interviewed while fishing had a lifetime trout fishing license.

Respondents to the mail survey ranged in age from 18 to 90 and averaged 57, slightly older than the average age of 48 from the 2008 VDGIF Trout Survey. Males comprised 91% of the respondents and about equal numbers of them were employed (46%) or retired (47%). A total of 45% of survey respondents had a lifetime trout fishing license and 37% bought their general fishing license only to fish for stocked trout. Respondents fished for stocked trout about 12 days per year.

## Types of Anglers

We identified different types of anglers during creel surveys as well as in the mail survey (Table 2). Anglers differed in several ways, including the type of tackle they fish with, how often they harvest stocked trout, how much money they spend pursuing stocked trout, how often they fish, and how important stocked trout are to their lifestyle (e.g., fishing-related vacations and magazine subscriptions). Segmenting anglers based on these attributes provides a useful way for managers to develop strategies that satisfy the various groups of anglers that exist in Virginia.

Table 2. Relative characteristics of Virginia's stocked trout anglers.

	Types of Anglers			
	Occasional	Generalist	Traditionalist	Specialist
Type of tackle used	Bait	Bait, lures, and flies	Bait	Flies
Harvest frequency	Nearly Always	Sometimes	Often	Rarely
Investment in equipment	Low	Moderate	Low	High
Membership in organizations	No	No	Occasionally	Yes
Trout fishing frequency	Low	High	High	Moderate

## Year-round Season

Since 1996, VDGIF has maintained a year-round trout season with stockings occurring from October through May. This year-round season eliminated the opening day of trout season for stocked fish, which generally occurred on the first Saturday in April. Virginia's trout anglers overwhelmingly support the year-round season (Figure 5; 1,707 responses from the mail survey and 1,937 responses from the on-site survey).

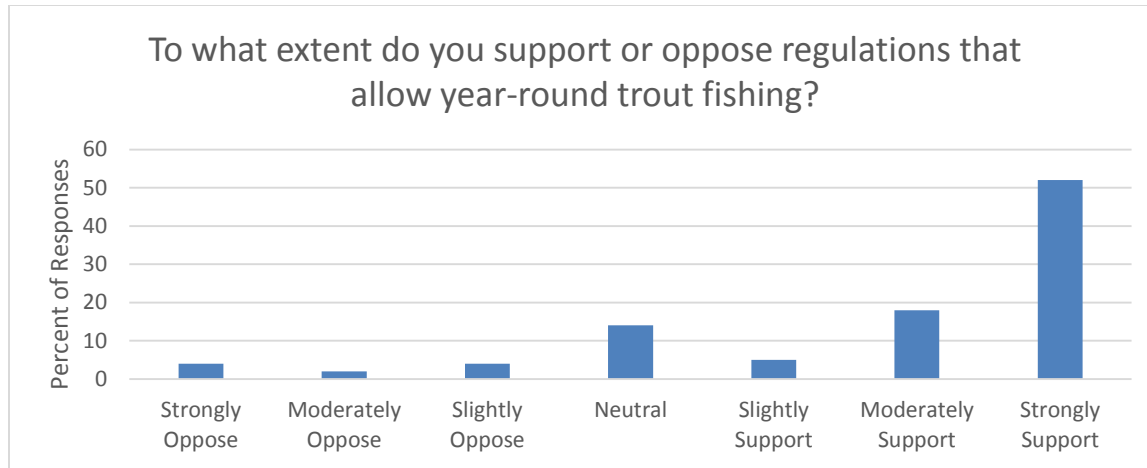


Figure 5. Support for year-round trout season from mail survey.

An alternative way of looking at angler preference for the year-round season versus having a defined opening day was asked during the creel surveys. Anglers strongly opposed VDGIF returning to having a spring stocked trout season that included an opening day (Figure 6).

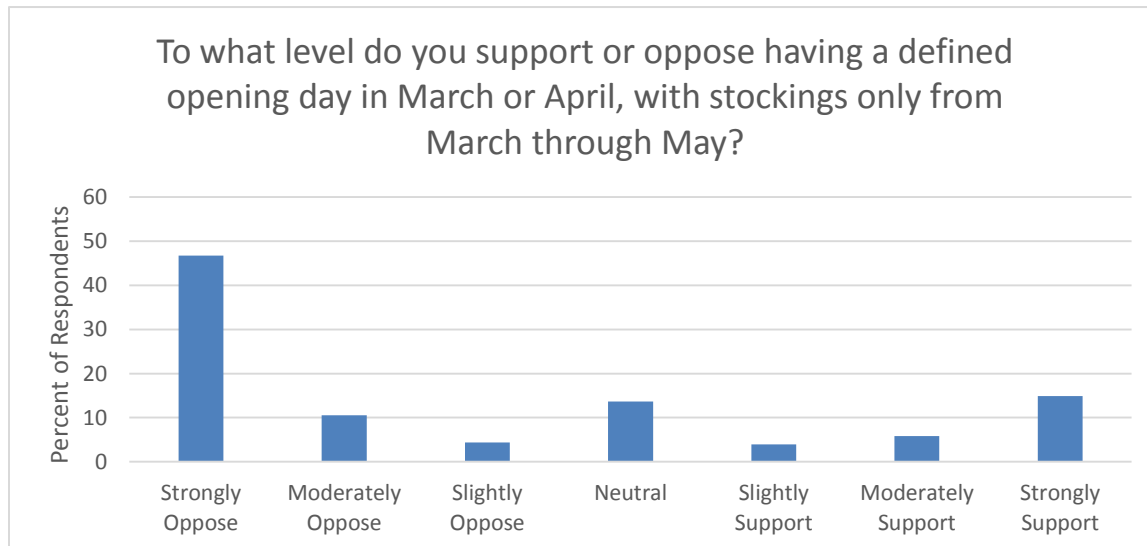


Figure 6. Support for having an opening day and spring trout season from creel survey.

### Stocking Announcements

Virginia's stocked trout anglers differ greatly in how they prefer stockings to be announced. Nearly equal proportions prefer the three possible announcement types (announced

prior to stocking, announced at 4 PM the day of stocking, and stockings not announced at all; Figure 7).

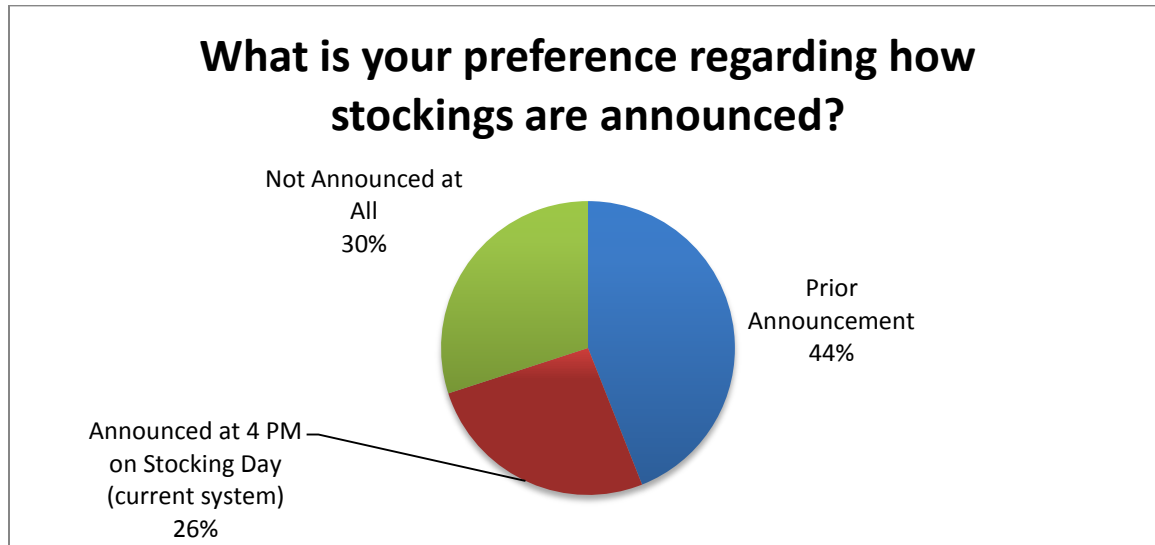


Figure 7. Preferences for how trout stockings are announced.

Anglers often desire to catch more and larger trout. However, hatcheries cannot satisfy these competing goals simultaneously. The production of more trout will mean that the average size is smaller. Conversely, to produce larger-than-average trout, fewer trout will be produced. When asked to select which they would prefer, slightly more Virginia trout anglers favored VDGIF stocking fewer, but larger trout. However, a portion of anglers (37%) preferred stocking of more trout, even if those trout were smaller (Figure 8).

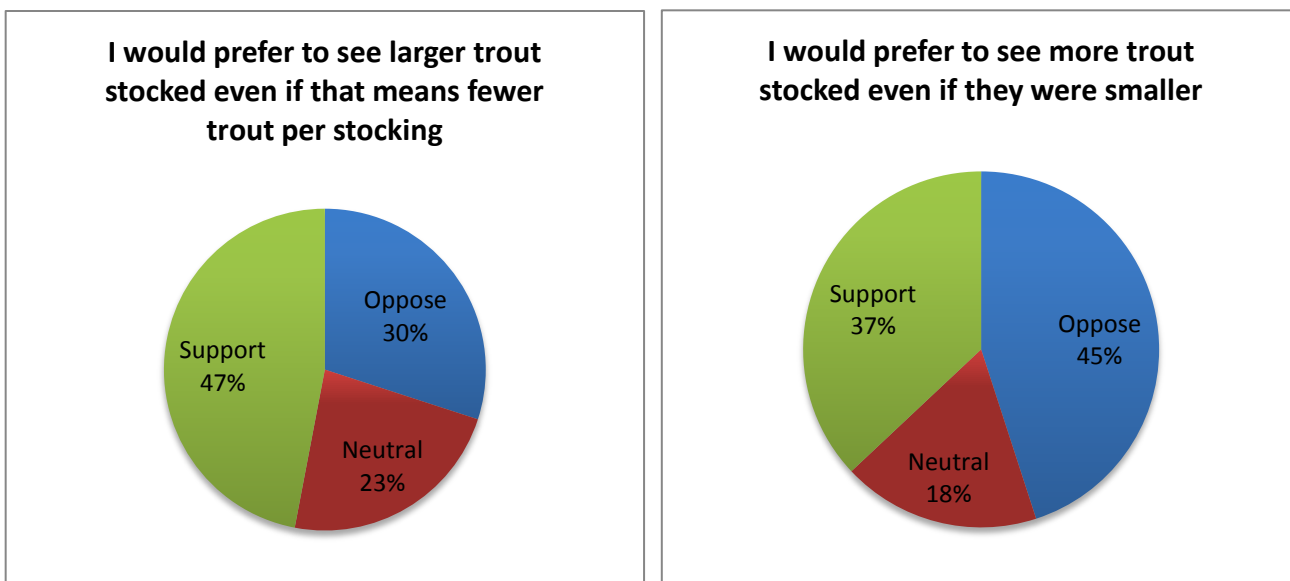


Figure 8. Support for VDGIF stocking more but smaller trout and for fewer but larger trout.

## Motivations to Fish

Motivations represent outcomes anglers desire from their fishing experiences. Anglers fish for a variety of reasons including opportunity for relaxation, joy of catching fish, and to get away from the daily routine. Conversely, catching fish to eat, catching trophy fish, and to be alone were less important reasons why anglers fish for stocked trout. Generally, respondents from the mail survey found natural settings (non-catch attributes) of trout fishing to be more important than actually catching fish. Anglers interviewed while fishing differed slightly from mail survey respondents. The top response to the question, “What are the three most important reasons for your decision to fish here today?” was, “To relax and/or to be outside,” the next two most common responses were catch-related: “I know it was stocked recently,” and “To catch fish for food.”

## Satisfaction with Fishing

While motivations represent the desired outcomes of fishing, satisfaction relates to the perceived fulfillment of those outcomes. Overall, Virginia’s stocked trout anglers were satisfied with the variety of trout fishing programs managed by VDGIF: catchable stocked trout waters, delayed harvest, urban waters, Heritage Day, and fee fishing areas.

Just as motivations differed between catch and non-catch attributes, so did satisfaction. Satisfaction for non-catch aspects of fishing (e.g. being outdoors, relaxing experience, being in a natural setting) scored significantly higher than the number and size of trout caught. Overall however, respondents from on-site surveys were highly satisfied with their fishing experience that day (Figure 9) and with the management of the program in the last 12 months (Figure 10).

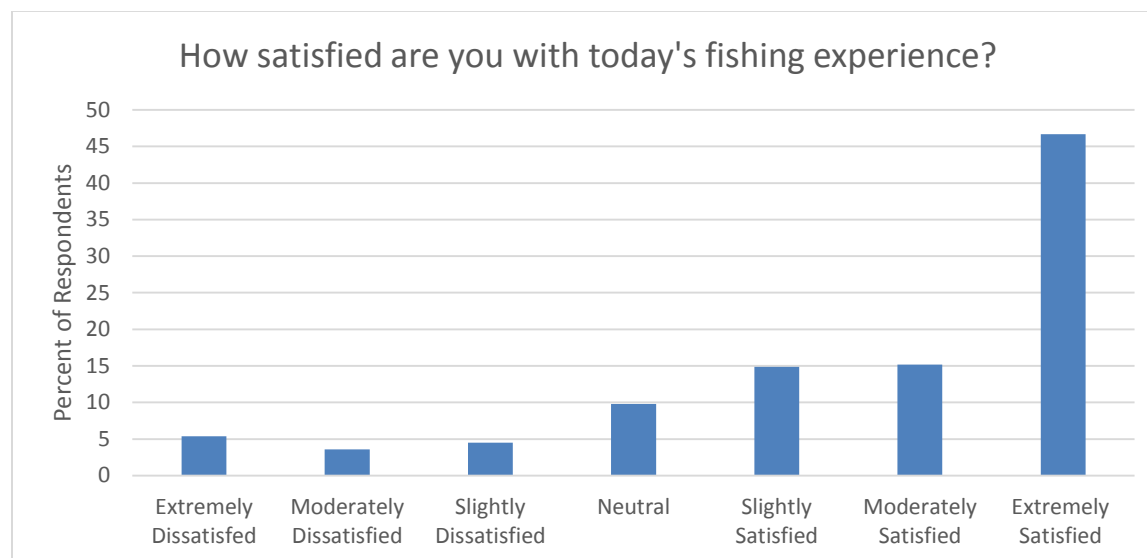


Figure 9. Angler satisfaction with fishing on day of interview.



Figure 10. Angler satisfaction with stocked trout fishing during the last 12 months.

### Harvest Orientation

Fewer than half of Virginia's stocked trout anglers reported in the mail survey that they always or often keep the fish they catch (Figure 11). Nearly equal numbers of anglers never or rarely harvest stocked trout. On-site surveys however, reveal that over 67% of anglers harvested at least one trout they caught per trip.

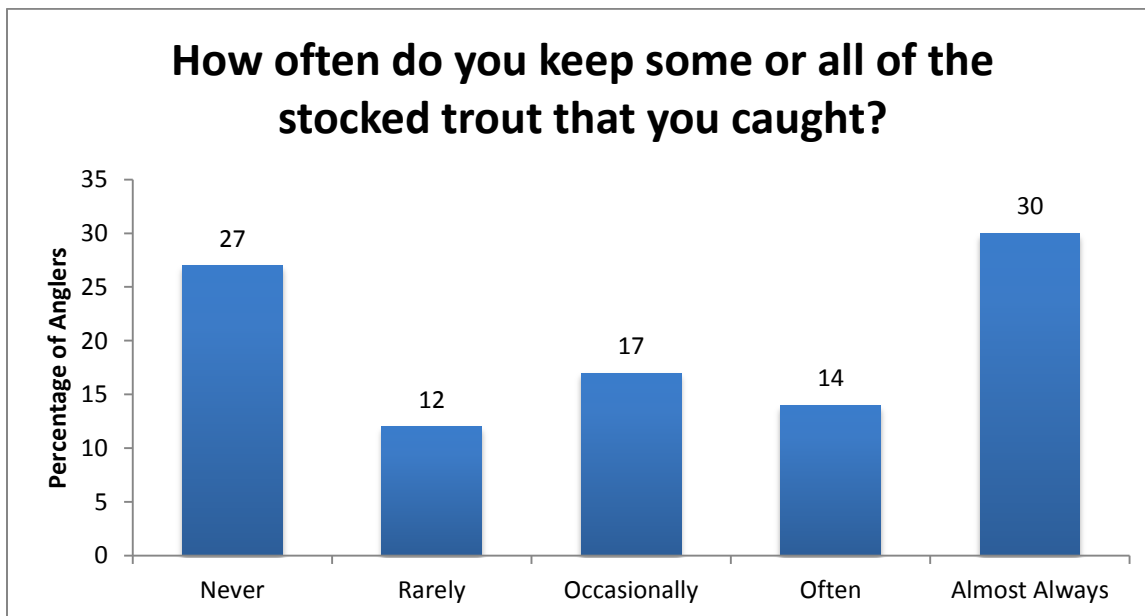


Figure 11. Relative frequency of how often anglers harvest stocked trout.

## Catch Rates

A widely accepted objective among fisheries management agencies is to have their anglers catch approximately one trout per hour fishing (Catch rate = one fish per hour of fishing). Catch rates on Virginia waters were around 1.4 fish per hour of fishing on days that waters were stocked. However, catch rates remained around one trout per hour for a month after the trout were stocked (Figure 12). Despite high catch rates immediately after stocking, more than half of the stocked fish remained throughout the first weekend after stocking. Throughout the 8-month season, anglers caught 48% to 100% of each batch of fish stocked.

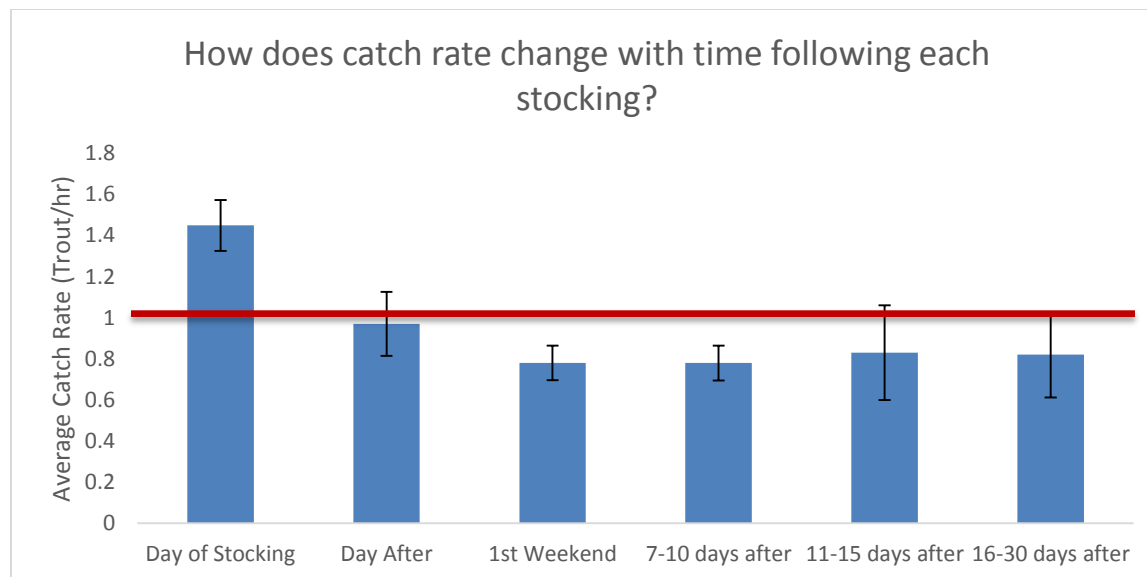


Figure 12. The average number of trout caught per hour of fishing relative to the day of stocking. The horizontal line represents the objective of one trout caught per hour of fishing, while the black vertical bars represent the mean standard error.

## Distribution of Fishing Effort

In 2011, over 111,000 anglers fished for trout in Virginia with over 80% of that effort focused on stocked trout waters (U.S. Fish and Wildlife Service and U.S. Census Bureau 2011). The time spent fishing varied with time after stocking and with each season. The time spent fishing following each stocking peaked the day after stocking and declined thereafter (Figure 13). More anglers fished during the spring and fall months than in the winter months (Figure 14).



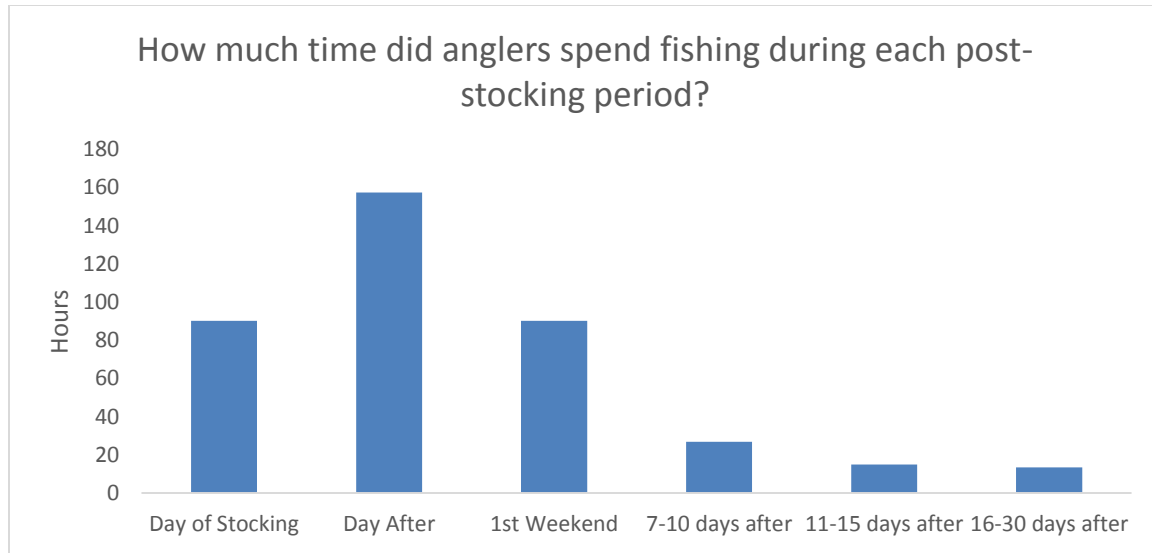


Figure 13. Distribution of time spent fishing relative to day of stocking.

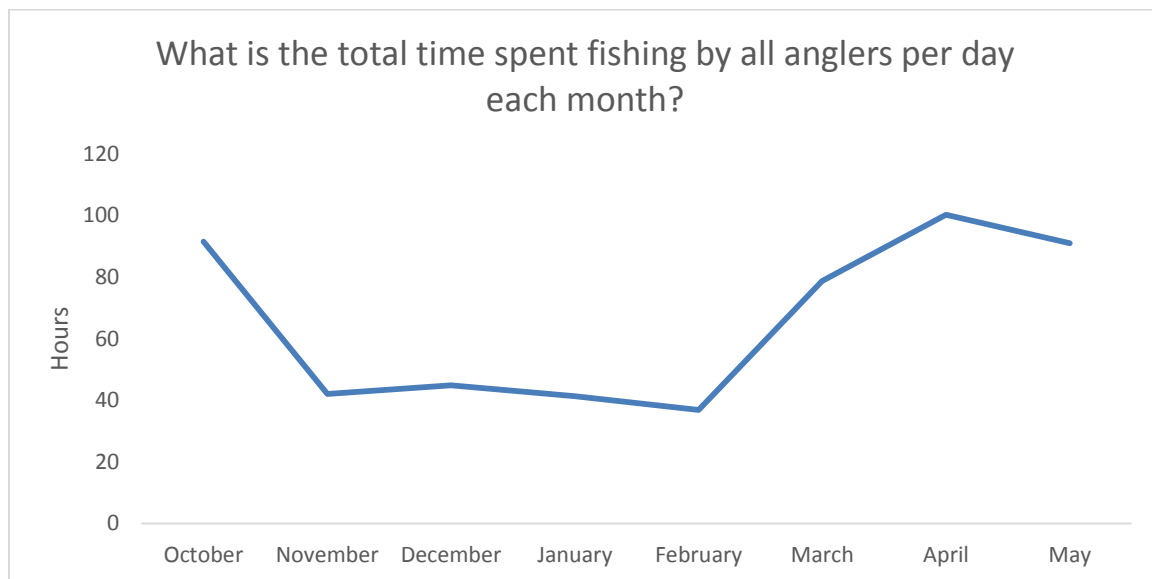


Figure 14. Monthly averages of time spent fishing for stocked trout.

### Trends in Participation

Not all anglers fish for stocked trout every year. In fact, during the last 5 years, only half of Virginia's stocked trout anglers bought a trout license to fish in each of the five years and 16% only purchased a license once or twice. Anglers who cease to participate are referred to as lapsed anglers. The "drop in-drop out" rate of lapsed anglers is due to a number of factors.

Many anglers cite too many work and family commitments as a constraint to fishing. Others participate in other recreational activities rather than fishing for stocked trout. Finally, others continue to fish, but not for stocked trout. Nearly 70% of lapsed trout anglers intend to participate in the future despite being busy with commitments and because fishing for stocked trout is a relaxing experience, and they enjoy being outdoors. Therefore, many lapsed anglers are not lapsed forever but tend to “drop in and drop out.”

## HATCHERY PRODUCTION

To meet production and distribution needs, VDGIF operates five coldwater fish culture facilities (Table 3). Each facility can rear fingerlings to catchable size, but only three of the five have hatching capability. This presents some logistical challenges regarding transport and distribution, particularly in regards to biosecurity (concern for introduction of diseases or parasites). While the hatcheries share characteristics, they vary in key production elements (Table 3). VDGIF has been working to update facilities to meet contemporary fishery demands while also protecting natural resources, but this can be costly and, as a result, often slower than desired.

The facilities range in age from approximately 80 years (Marion Fish Culture Station) to the most recently renovated, Coursey Springs, which was rebuilt in 2010. The average age of Virginia's Coldwater production facilities is around 55 years, and only one major renovation (Coursey Springs Fish Culture Station) has been completed for the Coldwater system in the past 50 years. No hatching capability has been added during that time. Despite this, facilities have taken small steps to improve and maintain production, including new filtration and oxygen systems (Table 3) at several facilities. As a result, total fish production has remained consistent and even improved in recent years.

Table 3. Hatchery comparison table: Virginia's Department of Game and Inland Fisheries has five coldwater Fish Culture Stations (FCS's) that vary in species reared, construction era, and production technology.

Fish Culture Station	Construction era	Species		Technology		UV filtration	Challenges
		Reared	Spawned	Triploid egg production	Oxygen supplement		
Coursey Springs	2010 (renovated)	Brown Trout Brook Trout Rainbow Trout	NA	NA	Yes	No	Water flow Lack of filtrations No hatching capability
Marion	1930s	Brown Trout Brook Trout Rainbow Trout	Brown Trout Brook Trout Rainbow Trout	No	No	No	Crumbling infrastructure Lack of filtration Water drainage specific pathogen No Oxygen supplementation Deferred maintenance
Montbello	1930s	Brown Trout Brook Trout Rainbow Trout	NA	NA	No	Yes	No hatching capability No Oxygen supplementation Water flow
Paint Bank	1960s	Brown Trout Brook Trout Rainbow Trout	Brown Trout Brook Trout Rainbow Trout	Yes	Yes	No	Deferred maintenance
Wytheville	1960s	Brown Trout Brook Trout Rainbow Trout	Brown Trout Rainbow Trout	Yes	Yes	Yes	Deferred maintenance

Historically, fish production numbers have not been collected in a consistent manner across facilities and were not stored digitally. With global developments in computational access and power, data collection has changed drastically. In recent years, this trend has changed for VDGIF, and data are gathered more consistently and assembled in an easily accessible, digital format. Over the past five years, VDGIF has stocked an average of 1,076,825 trout per year, with an annual average total weight of 537,513 pounds, and at an average individual size of 0.51 pounds (approximately 11 inches). With ongoing small-scale updates, these numbers have potential to increase (generally, when number of fish increases, the size decreases, and vice versa), but constraints like deferred maintenance, fish health stressors at high density, and biosecurity present consistent challenges.

Each facility works as part of a statewide production team to meet state stocking needs. Generally, each facility focuses on stocking particular counties (Figure 15). In order to balance resources across the state, facilities stock outside their designated area when necessary.

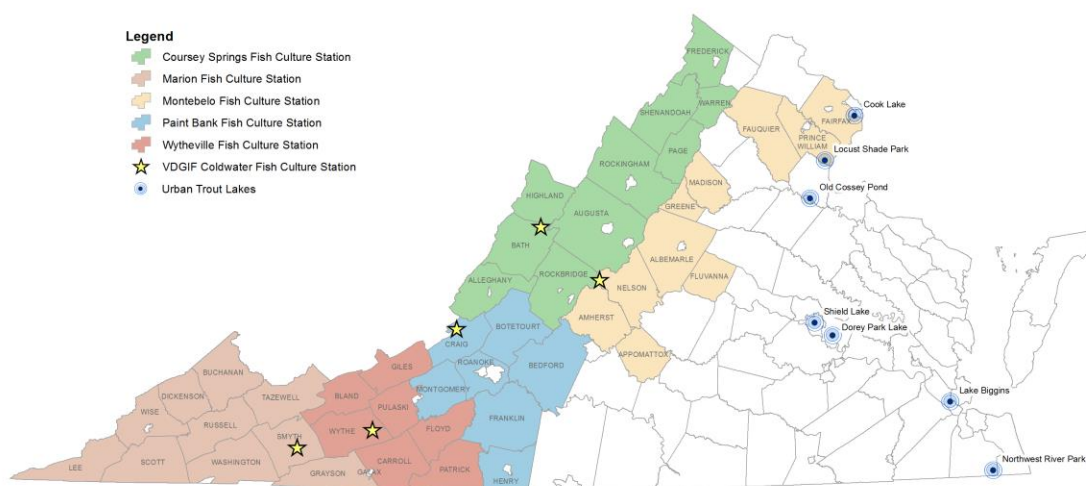


Figure 15. Trout production facility locations and the geographic areas they service. Urban trout lakes are serviced by Montebello and Coursey Springs Fish Culture Stations.

### Growth to stocking size

In Virginia, most stocked trout are grown to catchable size prior to stocking. This allows for immediate harvest, and may limit holdover in areas where undesirable. Growth to stocking

size (at least 7 ") varies among species and rearing conditions, but some general rules apply. For instance, fish in an indoor facility with tight environmental control can reach stocking size in as little as six months. However, those are in ideal conditions that are often unrealistic outside of expensive and complicated indoor production systems. In an outdoor setting, with natural environmental fluctuations and high rearing densities, growth rates vary, and trout may take up to a year or more to reach stocking size.

## **Biosecurity**

Biosecurity is defined as measures taken to prevent exposure to harmful biological, chemical, or physical agents that may cause adverse health effects in humans or animals. These agents include infectious microorganisms, such as bacteria, viruses, and parasites, and also non-infectious entities, such as toxins, contaminants, and poor water quality. Biosecurity practices are often initiated in aquaculture facilities in order to meet economic, public health, production, and fish health objectives. Specifically, certain biosecurity practices seek to:

1. Reduce the risk of pathogen introduction into a facility;
2. Minimize the risk of disease spread throughout a facility;
3. Minimize the risk of disease spread out of the facility through cultured product;
4. Reduce conditions that increase the risk of stress and disease susceptibility in a population;
5. Promote overall fish health;
6. Protect economic investment and reputation; and
7. Protect human health.

Pathogens may enter a system at several critical points and pose a hazard to susceptible fish. These include, but are not limited to, imported live fish or fish products (e.g., eggs, fingerlings, broodstock), contaminated source water, commercial feeds, live feed, frozen foods, inanimate objects, such as equipment, that can transmit a pathogen from one population to another, or vectors such as humans or animals (including predatory birds or mammals). Identification of pathogens that are potential threats and pathogens that have been historically diagnosed on-site should be identified prior to drafting a biosecurity plan. Additionally, the most significant threats to the biosecurity of a facility (e.g., untreated surface water, importation of commercially raised fish for rearing or forage on-site, transfer of fish between state hatcheries, equipment that is used in multiple systems or shared between hatcheries, nearby nesting sites of fish-eating birds, proximity to water body with zebra mussel populations) should be identified and specifically addressed by the four essential elements of any biosecurity plan: 1) disease prevention, 2) security precautions, 3) cleaning and disinfection, and 4) disease surveillance.

Biosecurity plans should be tailored to an individual facility; a generic biosecurity plan should never be applied to an aquaculture facility; existing staff, budget constraints, estimated risk, and available equipment all need to be considered. Biosecurity plans are dynamic documents that should be reviewed on a regular basis and amended when situations change. The first step in drafting a biosecurity plan is to critically examine each portion of the facility and all aspects of production to identify potential biosecurity risks or hazards. The guidelines should then be developed to minimize each potential risk to an acceptable level. While some risk is

unavoidable, the goal is to create a workable, enforceable, and practical biosecurity plan with an *acceptable* level of risk.

VDGIF is taking steps to initiate a standardized, system-wide disease-monitoring plan for the Coldwater facilities in order to assess and classify each facility. This will allow for improved, site-specific biosecurity plans, in addition to increasing the agency's ability to manage ecological impact. Early assessments have been run and production and stocking strategies have been adjusted to protect natural resources and maintain production.



### **Rainbow Trout (*Oncorhynchus mykiss*)**

Rainbow Trout prefer well oxygenated, high quality water under 70 °F. Rainbow Trout typically live in shallow rivers with gravel bottoms, but Rainbow Trout have established self-sustaining populations in rivers with bedrock bottoms and spring creeks. Lake- resident Rainbow Trout inhabit cool, deep lakes with sufficient habitat to get through the hot summer months and that have an adequate food supply. Rainbow Trout eat a wide variety of prey, including insects, crustaceans, mollusks, and small fish. The primary food supply depends on the rainbow's habitat and availability of a particular prey within the habitat.

Rainbow Trout are native to the Pacific basin, from the Kamchatka Peninsula in Russia, throughout the Aleutian Islands and southwest Alaska, the Pacific coast of British Columbia and southeast Alaska, and south along the west coast of the U.S. to northern Mexico. Rainbow Trout were originally found inland in the western U.S. occasionally as far east as the Rocky Mountains, west of the continental divide and downstream of waterfalls and other natural barriers. Since 1875, Rainbow Trout have been widely introduced throughout the U.S. and throughout the world. The first rainbow-producing hatchery, established on San Leandro Creek in northern California in 1870, began production in 1871. The first shipment of fish to other hatcheries occurred in 1875, shipping fish to Caledonia, New York, and in 1876, to Northville, Michigan. In 1877, the first National Fish Hatchery System was established on Campbell Creek in northern California. Some of the earliest Rainbow Trout propagation and stocking in Virginia may have occurred at the Montebello Fish Hatchery in Nelson County in the 1920s. U.S. Fish and Wildlife Service records indicate that Rainbow Trout were released into Shenandoah National Park as early as 1943.

Rainbow Trout are the most popular and easily reared of the trout species because of their highly adaptable nature and rapid growth. Desirable traits of Rainbow Trout include high survivability (tolerant of crowding), voracious feeding, excellent adaptability to artificial feeds, and ready availability as eggs, fingerlings, or adult stock at almost any time of year. Anglers regard Rainbow Trout highly due to its excellent fighting qualities, including frequent leaping when hooked. The fish is pursued using a multitude of angling techniques, including fly fishing, spinning, and casting with live and artificial baits, and trolling. Rainbow Trout also provide excellent table fare, supporting an extensive commercial culture industry.

Rainbow Trout require cold water with an optimum growth temperature range of between 55 to 65 °F, high water quality, and nutritional feed with high fat and protein content

(high-priced feed). Each Virginia coldwater facility faces its own group of challenges in rearing Rainbow Trout, including fluctuating water temperatures and flow rates, water quality, space, predation, and disease control. Rainbow Trout are well suited for Virginia stocked trout waters because existing VDGIF facilities match the specie's needs well and Virginia anglers enjoy catching them. The coldwater hatchery system has several strains of Rainbow Trout that spawn at different times of the year. The Shasta Rainbow Trout spawns in winter and produces a desirable-sized fish for stocking in the fall and winter months.



### **Brown Trout (*Salmo trutta*)**

Brown Trout first arrived in the U.S. on February 24, 1883 as eggs aboard the German steamship *Werra*. These eggs were distributed to three hatcheries in the U.S.: Cold Harbor Hatchery on Long Island, NY, the Caledonia Fish Hatchery in western NY, and the U.S. Fish Commission hatchery in Northville, MI. Over the following years, these initial stocks were reinforced with the importation of more eggs from Western Europe. Brown Trout continue to be cultured in the U.S. for recreational uses to this day.

Brown Trout are used mainly for recreation purposes in the U.S., and unlike Rainbow Trout, Brown Trout rarely are raised for commercial food operations. They have a temperature range similar to that of Rainbow Trout, but can handle a wider range of water quality parameters than either Rainbow Trout or Brook Trout. This makes them a good candidate for stocking marginal waters where Rainbow or Brook Trout may not perform well. Additionally, Brown Trout have the best chance to “hold over,” due to greater tolerance for marginal habitats and wariness to lures. This elusive behavior also makes them a favorite of many advanced anglers.

Brown Trout were officially first stocked in Virginia's waters in the 1950s by the Virginia Game Commission (now VDGIF). These fish were obtained from the U.S. Fish & Wildlife Service White Sulphur Springs Fish Hatchery, and were stocked into the Roanoke River and into Smith River below Philpott Dam. In Virginia, Brown Trout fill a niche in larger streams and lakes. Unfortunately, they can be detrimental to native fishes due to their tendency to feed on other fish. As a result, biologists are now careful in the placement of Brown Trout to preserve native and naturalized fishes. Rearing by VDGIF likely began in the 1960s after initial introductions indicated that anglers desired Brown Trout for sport.

Brown Trout prefer deep streams with moderate to slow currents, which allows them to perform well in large lakes with an adequate forage base. They prefer rocky, coarse river and lake bottoms, and feed on a wide variety of forage ranging from algae to aquatic invertebrates to other fish.

Brown Trout tend to grow slower to 10 inches than either Rainbow or Brook Trout. However, upon reaching a size that allows them to prey on other fish, Brown Trout may grow faster than comparable aged Rainbow or Brook Trout. While they are susceptible to some bacterial infections common to cultured trout, Brown Trout demonstrate a natural resistance to Whirling disease, which can devastate to Rainbow Trout. VDGIF avoids stocking Brown Trout into waters where they would compete with the native Brook Trout. Ideal stocking locations

include waters where Brown Trout will not compete with Brook Trout, or where they may negatively impact populations of threatened or endangered fishes. This can include large lakes with adequate forage and water quality parameters.



### **Brook Trout (*Salvelinus fontinalis*)**

Brook Trout prefer water temperatures below 65 °F and do not tolerate higher water temperatures as well as Rainbow and Brown Trout. Brook Trout require very high water quality that is well oxygenated. They inhabit large and small lakes, rivers, streams, creeks and spring ponds, but prefer small spring ponds and small spring-fed streams that are typically headwaters to larger tributaries. Preferred stream habitat includes sand and gravel bottoms with very little siltation. Brook Trout prey on a wide variety of items, with younger fish feeding on small insects and adults feeding on many types of aquatic insects, terrestrial insects, snails, worms, and small fishes.

Brook Trout are native to a wide area of Eastern North America (including Virginia), Canada from the Hudson Bay basin east, the Great Lakes-Saint Lawrence system, the Canadian maritime provinces, and the upper Mississippi River drainage as far west as eastern Iowa. The southern range of native Brook Trout has been reduced to high-elevation, remote streams due to habitat loss and introductions of Brown and Rainbow Trout. Their range expanded westward as early as 1850 through intentional introductions. Brook Trout may have been stocked out of Montebello Hatchery as early as the 1920s or 1930s.

Although Brook Trout are popular with anglers, they can be difficult to rear in some hatcheries. Brook Trout grow well with preferred water qualities, but they do not tolerate less-than-ideal waters similar to Rainbow or Brown Trout. Brook Trout's higher sensitivity to temperature, crowding, low oxygen, and other aquaculture stresses can make it more difficult to rear in captivity than Brown or Rainbow Trout. Brook Trout require an optimum growth temperature of about 59 °F, very high water quality, and nutritional feed with high fat and protein content (high-priced feed). Brook Trout are especially difficult to rear at facilities that encounter drastic temperature changes, water flow fluctuations, and water quality issues. At most aquaculture facilities, Brook Trout must remain in the upper sections of raceways to obtain optimum water quality for growth and fish health.

Desirable qualities of Brook Trout include their colorful appearance, native appeal, and adaptability to artificial feeds. Brook Trout are particularly popular among fly fishermen. Many anglers prefer the taste of Brook Trout to that of other Trout. Due to its status as the only trout native to Virginia, many conservation-minded anglers practice catch-and-release fishing for Brook Trout.

### **Triploid Trout**

Triploid fish have three sets of chromosomes, instead of the two sets (diploid) normally found in trout. Female triploids do not develop eggs and although male triploids develop sperm,



they are much less fertile than normal diploid fish. Triploids are effectively sterile and rarely occur naturally. Triploid varieties of many species of fish have been created for commercial and recreational purposes. Because triploid fish do not reproduce, they put more energy into growth and produce larger fish at reproductive age than fertile, diploid fish. In Virginia, triploid varieties of Rainbow Trout, Brown Trout, and Brook Trout are produced by subjecting freshly fertilized eggs to either heat or pressure shocks. Several states stock triploid trout, including Idaho, North Carolina, Arizona, and Virginia. Virginia stocks triploids as catchable fish to prevent interbreeding with Southern Appalachian Brook Trout stocks. In addition, triploids are utilized as a measure to prevent the establishment of natural-reproducing populations of Rainbow, Brown, and Brook Trout in undesirable waters.

Triploid production in Virginia began in 2005, at Paint Bank Hatchery with Rainbow Trout. At that time, Virginia produced about 15,000 triploid fingerlings. Currently, Paint Bank and Wytheville hatcheries create triploid Brook, Brown and Rainbow Trout. In 2014, VDGIF produced approximately 400,000 triploid fingerlings. Extra triploids not used for specific watersheds are stocked as needed in any stocked trout water. Some of VDGIF's hatcheries also grow triploids to produce "big fish" for stocking purposes. Triploid fish do not differ in physical appearance compared to diploid fish. The desirable qualities of triploid fish (i.e., reproductive sterility, rapid growth) have resulted in increased demand for them. Triploid trout, especially Brook Trout, are harder to rear in the hatchery system. Fertilization, hatch, and survival rates of triploids are lower than those of diploids. Thus, more eggs are required to make triploids than diploids. Hatcheries are improving triploid production techniques and VDGIF likely will continue to use triploids in the future. Marion Hatchery does not yet have equipment for making triploids.

## VALUES, GOALS, OBJECTIVES, AND POTENTIAL STRATEGIES

The SAC members, with technical assistance and feedback from VDGIF staff, drafted five goals addressing stocked trout management. These goals reflect the values of a diverse public and are broad statements of principles and ideals about what should be accomplished with stocked trout management in Virginia. As the underpinning for the direction of stocked trout management, these guiding public values should be relatively stable for the period of the plan.

Specific objectives follow each set of value and goal statements. Based on the goals identified by the Stakeholder Advisory Committee, the Technical Committee established specific objectives to help guide the attainment of each goal. Objectives are the technical expression of the public vision found in the goal statements. Objectives are generally more specific, quantifiable, and have milestones for achievement.

Potential strategies clarify how each objective might be achieved. As with objectives, technical management decisions about specific operational strategies to achieve public values are largely the realm of fisheries professionals. Implemented strategies will be based on the best available science, anticipated efficacy, public acceptability, and expected costs. While this is not an operational plan detailing all the specific steps, actions, or costs to achieve objectives, these strategies represent some of the approaches, techniques, and programs that will be considered to accomplish objectives.

## STOCKING ANNOUNCEMENTS

*Under current policies, VDGIF announces waters that have been stocked at 4:00 p.m. each day. The only stocking events announced in advance are those waters stocked for Heritage Day and for kids fishing events where VDGIF supplies the trout. Virginia trout anglers are divided over the issue of announcing stocking events. A 2014 survey showed that 26% of Virginia trout anglers preferred the current policy of delayed stocking announcements, while 29% of trout anglers preferred no announcement of stocking events. Twenty-two percent of anglers preferred to have stocking events announced for the whole trout fishing season prior to its beginning, with another 23% preferring prior announcements on a daily, weekly or monthly basis. The issue of when to announce stocking events (or whether to announce them at all) is important because of concerns regarding equity of access to stocked trout. Prior announcement of stocking events allows anglers to plan fishing trips but announced stockings sometimes cause crowding and traffic safety issues when many anglers arrive at the announced time and place. Unannounced stocking events may alleviate some of the crowding and safety issues, but favor those anglers who follow the hatchery trucks, or learn of the trucks' destinations via phone trees or social networking. Delayed announcements (the current policy) provide an alternative to prior announcements and unannounced stocking events.*

*Prior to 1996, stocked trout fishing began on Opening Day (Saturday in late March or early April) each year. Many anglers enjoyed this announced stocking. However, several issues existed regarding opening day. Landowners concerned with crowding withdrew some stocking*

*sites each year. Also, hatcheries can produce better quality trout if streams and lakes are stocked throughout the year. Angler surveys conducted periodically over the last 20 years indicate that about 75% of anglers support a year-round season with stockings occurring from October through May. In 2001, VDGIF began Heritage Day which provides an “opening-day” experience on the first Saturday in April. This announced stocking event occurs on about 20 waters each year. Trout are stocked that week and the site is closed to fishing until 9:00 AM on Saturday. Angler counts conducted by VDGIF indicate that fishing pressure is 3-4 times less on Heritage Day when compared to Opening Day counts on the same waters.*

## **Value Statement**

Virginia’s trout anglers have diverse expectations of how trout stockings should be announced. The ability to plan fishing trips is valued by many anglers who prefer that VDGIF announce stockings before they occur. Others feel that unannounced stockings provide for more equitable access to stocked trout and a more natural fishing experience that is less crowded. Still other anglers prefer announcements delayed until the end of the day stockings are made. Trout stocking announcements should be diverse, allow for increased participation, and advanced trip planning to meet the desires of different stakeholders. Various forms of announcements should be promoted.

## **Goal Statement**

Announce stockings using a variety of strategies (including prior announcement, post-stocking announcement, or no announcement) to provide equitable access to the resource and to address the diverse preferences of Trout anglers. In addition to existing Heritage Day events, some stockings will be announced in advance to allow anglers to plan fishing trips to coincide with known stockings. Other stockings will be announced at the end of the day when stocking occurs to reduce crowding and ensure the safety of anglers and VDGIF personnel involved with stocking.

## **Objectives and Strategies**

1. Continue the policy of not announcing stocking delayed harvest (except for the first stocking which is announced at 4:00 PM the day of stocking), catch-and-release, and other special regulation waters.
  - a. List unannounced stocking sites annually in the trout guide.
2. By 10/1/2016, announce in advance stocking events in Trout Heritage waters, fee fishing areas, urban trout waters, and kid’s fishing events.
  - a. List Trout Heritage waters annually in the trout guide.
  - b. List fee fishing areas annually in the trout guide.
  - c. Stock fee fishing areas on a regular basis multiple times per week, as described in the trout guide.
  - d. Announce stockings for kid’s fishing events at least 30 days in advance.
  - e. For urban trout waters, announce the week that stockings will occur at least 30 days in advance via the VDGIF website, the Outdoor Report, the Trout Line,

press releases to local media, and social media. Scheduled stockings are subject to change due to inclement weather, or unforeseen circumstances.

3. Identify at least two waters (by 5/1/2016) in VDGIF administrative region's 2, 3, and 4 to test prior announcement of one or more stocking events each year in those waters. Implementation should begin in 2017 and be tested for 2 years.
  - a. Identify waters that have adjacent landowners who are willing to cooperate with pre-announced stocking events.
  - b. Identify waters that are easily accessible by road, have adequate access to the water, and suitable parking areas (e.g., current Heritage Day waters).
  - c. Identify waters that's have existing infrastructure to support pre-announced stocking events (e.g., bathroom facilities, campgrounds).
  - d. Identify needs for law enforcement presence to control traffic and ensure safety of hatchery personnel and anglers and enforce stocking-day closure.
  - e. Schedule pre-announced stocking events to promote trout fishing at desired times (e.g., first fall stockings, weekends, holidays, free fishing weekend, and school break periods).
  - f. Investigate strategy stating water closed day of stocking and opened to fishing at 9:00 AM the following day.
  - g. Waters selected for prior-announcement will be stocked with more fish per stocking but with fewer stockings. This policy will result in the same number of trout stocked annually in those waters e.g., A waters will get stocked 4 times as opposed to 8.
  - h. Scheduled stockings are subject to change due to inclement weather, or unforeseen circumstances.
  - i. Assess angler use, opinions, and satisfaction with pre-announcement stockings.
  - j. Promote fishing education in schools (e.g., trout in the classroom, fishing clubs, etc.).
  - k. Report at end of two-year evaluation.
4. Continue the current policy of announcing stocking events at 4 PM the day of stocking except for waters that receive pre-announcements or for which stockings are unannounced.
  - a. Announce each day's stocking events at 4 PM online, through social media, and on the Trout Line.
5. Publish by July 15 each year a report that lists pounds of trout stocked by county and/or water in the previous 12 months.
  - a. Post the report on VDGIF's website.
  - b. Announce the availability of the report via the Outdoor Report and social media.

## ANGLER RECRUITMENT AND RETENTION

*Nearly 100,000 anglers fish for stocked trout in Virginia. Results from a 2009 statewide angler survey indicate that trout rank second to black bass in popularity with Virginia anglers. However, the average age of licensed trout anglers is 58, suggesting that ensuring a bright future for stocked trout fishing requires recruitment of new and younger anglers. The increasingly diverse human population in Virginia presents opportunities to reach out to new angling stakeholders. Additionally, roughly half of all trout license buyers do not purchase a license the following year and thus, retention of current anglers remains a high priority. These convergent demographic trends suggest that participation in fishing for stocked trout in Virginia will decline in the future, unless VDGIF initiates awareness strategies to counteract them.*

### Value Statement

The future of the stocked trout program relies on recruiting and retaining anglers. If current trends in participation in trout angling do not change, and the average age of anglers continues to increase, then the stocked trout program will decline because trout anglers financially support the program. The stocked trout program benefits local economies and strengthens communities as anglers seek recreational fishing opportunities. Stocked trout fishing increases environmental stewardship, outdoor participation, and preserves the long-standing tradition of fishing for stocked trout. Therefore, VDGIF should evaluate current and proposed policies to promote recruitment and retention of trout anglers, especially youth.

### Goal Statement

Inform and educate existing and potential future anglers and promote fishing for stocked trout to recruit younger and more diverse anglers to the sport and to retain those already engaged.

### Objectives and Strategies

1. By July 1, 2021, increase youth (under 16 years of age) participation in the stocked trout program by 10%.
  - a. Evaluate the number of license buyers ages 16-20 and compare that with historical data.
  - b. Quantify youth participation at kids' trout fishing events.
  - c. Increase number and distribution of kids' trout fishing events, including urban areas.
  - d. Assess the feasibility of limiting fishing to youth only until noon on select Heritage Day Waters.
  - e. Assess the feasibility of implementing youth-only days on selected waters.
  - f. Assess the feasibility of establishing youth-only stocked trout waters year-round.
  - g. Recommend to the Board of VDGIF inclusion of designated trout waters on free fishing weekend.
  - h. Recommend to the Board of VDGIF the inclusion of a group license for stocked trout.
  - i. Identify selected waters to stock for free fishing weekend in June.

- j. Schedule pre-announced stocking events to promote trout fishing at desired times (e.g., first fall stockings, holiday weekends, free fishing weekend, and school break periods).
  - k. Develop a competitive grant program that funds (e.g., fishing equipment and trout from private sources) non-VDGIF groups hosting kids' fishing events open to the public.
  - l. Promote fishing education in schools (e.g., trout in the classroom, fishing clubs, etc.).
2. By July 1, 2021, increase participation among females and minority populations in the stocked trout program by 10%.
  - a. Track number of females purchasing trout license.
  - b. Assess the potential for including fishing for stocked trout in programs aimed at increasing participation of females and minorities..
  - c. Develop multi-lingual signs, and educational material to target specific ethnic groups.
  - d. Promote stocked trout fishing opportunities among college outdoor activity organizations.
  - e. Promote urban fishing to attract more females and minorities.
3. By July 1, 2025, recruit new anglers to the stocked trout program to attain 100,000 trout-license buyers (including lifetime license) annually.
  - a. Assess angler participation, and motivations, constraints to participation, and management preferences in fishing for stocked trout via a statewide survey every 5 years.
  - b. Assess participation by new anglers using VDGIF survey data.
  - c. Modify the procedure for purchasing trout license online to assess prior license buying behavior.
  - d. Encourage trout license purchases among anglers who seek specialized fishing opportunities by creating special regulation fisheries throughout Virginia.
  - e. Promote stocked trout fishing opportunities among college outdoor activity organizations.
  - f. Assess the feasibility of changing the regulations on delayed-harvest waters to allow harvest sooner (e.g., Memorial day weekend).
  - g. Increase information available to trout anglers by maintaining an online record of stocking information (e.g., number stocked, pounds stocked, and average size by county and/or water).
  - h. Promote stocked trout fishing through other agencies, local governments, and other organizations.
4. Increase participation of non-residents by 10% in the stocked trout by program July 1, 2021.
  - a. Monitor non-resident participation in stocked trout fishing through sales of non-resident license sales.
  - b. Assess participation by non-resident anglers through VDGIF creel surveys.

- c. Increase information available to trout anglers by maintaining an online record of stocking information (e.g., number stocked, pounds stocked, and average size by county and/or water).
  - d. Conduct a survey of former and current non-resident anglers to assess motivations, constraints, license costs and options, and management preferences.
  - e. Collaborate with Virginia Department of Tourism to promote stocked trout fishing in Virginia to anglers in surrounding states.
  - f. Advertise stocked trout fishing in regional media outlets (e.g., regional magazines, websites, TV shows).
5. Develop and implement marketing strategies to promote the stocked trout program by July 1, 2018.
- a. Monitor traffic on social media sites.
  - b. Assess angler participation, and motivations, constraints to participation, and management preferences in fishing for stocked trout via a statewide survey every 5 years.
  - c. Promote trout fishing as an outdoor experience (tie into motivations).
  - d. Promote fishing for stocked trout by posting information and photos on Twitter, Facebook, Instagram and other social media outlets.
  - e. Promote stocked trout fishing through other agencies, local governments, and other organizations.
  - f. Increase information available to trout anglers by maintaining an online record of stocking information (e.g., number stocked, pounds stocked, and average size by county and/or water).
  - g. Identify schools and contact people that can help disseminate information about stocked trout fishing opportunities to students.
  - h. By July 1, 2018, launch an easy-to-use online resource providing details (directions, amenities, etc.) for each stocked trout fishing water.
  - i. Publish 8 articles per year informing the public of stocked trout fishing opportunities (VDGIF website/blog, the Outdoor Report, and VDGIF social media).

## FUNDING AND ADMINISTRATION

*The stocked trout program depends upon the revenue generated from the sale of trout licenses and general fishing licenses. None of the funding for the program derives from general state taxes. A trout license and a freshwater fishing license are both required to fish for stocked trout in Virginia. A 2008 survey revealed that 64% of trout license buyers purchased these two licenses to fish solely for stocked trout. The revenue from these “double” license sales is significant. Sales of annual trout licenses have decreased substantially in recent years, while sales of lifetime trout licenses have increased substantially. Since 2001, trout anglers purchased nearly 50,000 lifetime trout licenses, but the decrease in sales of annual licenses resulted in a net decrease in revenue to support hatchery production of catchable-size trout and maintain hatchery facilities. It is not known how many lifetime trout license holders continue to fish for stocked trout.*

## **Value Statement**

To continue current operations, the stocked trout program must account for costs associated with annual production, support regular facility maintenance and promote improved efficiency in a transparent manner. Currently, license fees cover most of the operating costs of the program. However, the expensive and rising costs associated with producing and transporting stocked trout, including, law enforcement, and public outreach not only limit the scope of the current program but also create future financial challenges. The license fee revenue should cover operating costs of the program while providing anglers with the opportunity to fish for stocked trout.

## **Goal Statement**

Maintain a productive and adequately funded stocked trout program, including investigation of alternative funding and resource mechanisms to meet current and anticipated future demands. Maintain an open and transparent decision-making process regarding management of stocked trout.

## **Objectives and Strategies**

1. Conduct a financial evaluation of the trout program and develop strategies based on those results by January 1, 2017.
  - a. Conduct a detailed evaluation of license sales and types of licenses to assess effects on VDGIF revenues.
  - b. Identify and evaluate different approaches to increase license sales including approaches of other states, for example multi-year licenses, rollover licenses and automatic renewal or notification.
  - c. Evaluate demographic trends for potential impacts on future license sales.
  - d. Estimate the annual operating cost of the stocked trout program including the cost-per fish.
  - e. Identify annual maintenance costs and future needs for renovations at coldwater hatchery facilities and equipment and develop strategies to address costs and future needs.
  - f. Identify opportunities to establish partnerships with interested parties, both private and public, to achieve objectives of the Stocked Trout Management Plan.
  - g. Improve efficiency of hatchery production through research and development.
2. Publish an annual report detailing accomplishments and progress in achieving objectives of the Stocked Trout Management Plan by September 30 each year.
  - a. Compile an annual stocking report detailing quantity and locations (county and/or water) of fish stocked for the period from October of the previous year through May.
  - b. In the case of production shortages, a reduction in stocking will be made on a percentage basis statewide.



- c. Report on progress made relative to specific plan objectives using multiple media outlets (e.g., VDGIF website, Outdoor Report, press releases, social media) to improve public awareness of the program and its progress.

## **ECOSYSTEM EFFECTS**

*Catchable stocked trout interact with other fish and aquatic organisms, including native species when introduced into streams or lakes, which may cause concerns about whether those interactions negatively affect the species already present. High angler use associated with some catchable trout stocking sites may harm riparian buffers, and/or increase erosion, littering, and sedimentation.*

### **Value Statement**

VDGIF should balance the benefits of stocked trout fishing with effects on the ecosystem. Virginia anglers should value wild trout populations, including native brook trout in addition to stocked trout and the effects of trout stocking on native aquatic species should be considered. Virginia stocked trout anglers should value the protection of habitat and the conservation of quality trout habitat.

### **Goal Statement**

Manage trout stocking to optimize recreational opportunities while minimizing adverse impacts on aquatic and surrounding habitats, wild trout populations, including native brook trout, and other aquatic species. Manage habitat in stocked trout waters and preserve the aesthetics of the angling experience.

### **Objectives and Strategies**

1. Develop strategies to minimize the effects of stocking on existing wild trout populations, including native brook trout, by January 1, 2017.
  - a. Develop and publish the list of waters that contain existing native wild brook trout populations.
  - b. Continue to monitor wild trout distribution through the Coldwater Streams Survey.
  - c. No new wild brook trout waters that have a Class I or II coldwater stream classification will be added to the Catchable Stocked Trout Program.
  - d. When waters containing wild trout populations, including native brook trout are stocked, VDGIF will consider a variety of strategies to minimize the effects of stocking on wild fish, including not stocking trout, the species of trout being stocked, location and timing of stocking, and the use of sterile fish.
  - e. Continue research and development into fish production, focusing on the production of sterile trout.

2. Develop strategies to minimize the effects of stocking trout on existing/resident aquatic organisms in waters currently being stocked and when new waters are being proposed for addition to the stocked trout program by January 1, 2017.
  - a. In an effort to minimize the effects of stocking trout on resident aquatic species, VDGIF will consider a variety of strategies, including not stocking trout, the species of trout being stocked, location and timing of stocking.
  - b. When a new water is proposed to be added to the stocked trout program, VDGIF aquatic non-game/diversity biologists will be consulted to determine if stocking hatchery trout poses a threat to any resident aquatic species.
3. Develop strategies to minimize the effects of stocking and angler use on sensitive riparian terrestrial species and habitat in waters currently being stocked and when new waters are being proposed for addition to the stocked trout program by January 1, 2017.
  - a. In an effort to minimize the effects of stocking and angler use on resident riparian species or habitat, VDGIF will consider a variety of strategies, including not stocking trout, the species of trout being stocked, and the location and timing of stocking.
  - b. When a new water is proposed to be added to the stocked trout program, VDGIF terrestrial non-game/diversity biologists will be consulted to determine if stocking hatchery trout (angler impacts) poses a threat to any resident riparian species or habitat.
4. Develop strategies to address habitat issues in stocked trout waters by January 1, 2021.
  - a. Identify waters most-suited for collaborative management habitat issues.
  - b. Develop a list of potential collaborators for management habitat issues, and establish formal relationships where feasible.

## RECREATIONAL OPPORTUNITIES

*Stocked trout anglers differ in a number of characteristics, such as motivation for fishing, harvest practices, and type of equipment used. Anglers also seek different outcomes from their fishing experiences. Some anglers fish to get away from it all, while other anglers enjoy the social aspect of fishing with others. Some anglers release all or most of the fish they catch, while others look forward to keeping the trout they catch. Some anglers prefer to catch larger fish while others prefer to catch more fish, even if they are smaller. Since the “average angler” does not really exist, a “one-size-fits-all” management strategy satisfies few anglers. Thus, managers face the challenge of providing a wide variety of fishing opportunities to satisfy a diverse group of anglers.*

*Stocked trout generally create recreational fisheries in locations where natural fisheries do not exist. The demand for stocked trout fishing opportunities exceeds the current ability of VDGIF to supply the fish needed. Numerous streams and lakes in Virginia meet biological criteria to support stocked trout fisheries but are not currently stocked due to hatchery system limitations or concerns about access to the water. In addition, decisions about adding new waters to the stocked trout program must include consideration of labor force and funding to adequately enforce fishing regulations. Virginia’s Conservation Police Officers frequently assist*

*in stocking trout and their enforcement of trout fishing regulations is key to successful management of the resource.*

## **Value Statement**

The stocked program exists to create or enhance recreational fishing opportunities. These opportunities promote positive interactions with natural settings, relaxation, and social/family experiences. Trout angling provides opportunities to harvest or catch-and-release fish, stimulates local economies and encourages tourism. VDGIF should consider the diverse preferences of anglers, including the balance between the number and size of fish stocked, in developing and selecting management strategies.

## **Goal Statement**

Provide a diversity of stocked trout fishing experiences designed to meet diverse angler preferences and increase participation. Improve access to stocked trout waters for all anglers.

## **Objectives and Strategies**

1. Expand stocked trout fishing opportunities designed to appeal to a variety of angler preferences including developing trophy trout fisheries, catch-and-release fishing, delayed harvest, urban waters, and youth fishing opportunities by July 1, 2016.
  - a. Develop a list of potential waters suitable for alternative management strategies.
  - b. Identify new management strategies, for example developing trophy trout fisheries.
  - c. Expand existing alternative management programs, such as catch-and-release fishing, delayed harvest, urban waters, and youth fishing opportunities.
  - d. Evaluate current hatchery production techniques to meet the demand for new management strategies including size and number of fish, timing, frequency of stocking, and opportunities for reallocation of stocked fish.
2. Select 12 additional waters statewide to be managed with alternative management strategies (e.g., catch and release, delayed harvest, youth only, etc.) by October 1, 2017. This may include the conversion of current stocked waters to a new designation.
  - a. Establish criteria to prioritize waters for inclusion in the alternative management strategies program (e.g., angler use, proximity to other stocked waters, geographic location, habitat).
  - b. Conduct creel surveys on several waters selected for alternative management strategies to measure angler use and satisfaction.
3. Increase angler access to stocked trout waters where appropriate.
  - a. Identify locations that need increased access or where no improvement to existing access is desired by January 1, 2018.

- b. Collaborate with partners and localities to develop facilities that improve access throughout the life of the plan.
- c. Provide more ADA-compliant access to stocked trout waters.

## Appendix A. Stakeholder Advisory Committee members.

Name	Interest/Organization	County/City
David Angus	Angler	Amherst
Stuart Burrill	Angler	Big Stone Gap
Nick Collins	Angler	Churchville
Hugh Elliott	Angler, retired	Roanoke
Jimmy Graves	Graves Mountain Lodge	Syria
Cara Kauffman	Angler	Weyers Cave
Dawn Kirk	U.S. Forest Service	Natural Bridge Station
John Lipetz	Angler, youth education	Falls Church
John Rathburn	Angler, college student	Lynchburg
Graham Simmerman	Angler, Trout Unlimited	Weyers Cave
Kristin Stone	Angler	Annandale

## Appendix B. VDGIF Stocked Trout Technical Committee members.

Name	Agency Position
Brian Beers	Manager, Paint Bank Hatchery
Jason Hallacher	Region 4, Assistant District Aquatic Biologist
Elmo Herndon	Region 4, Conservation Police Officer
John Odenkirk	Region 4, District Aquatic Biologist
Steve Owens	Region 3, District Aquatic Biologist
George Palmer	Region 2, District Aquatic Biologist
Steve Reeser	Region 4, District Aquatic Biologist
Tim Tilson	Assistant Manager, Wytheville Hatchery
Nate Wilke	Statewide Hatchery Coordinator
Gene Wirt	Region 3, Conservation Police Officer
Eric Wooding	Manager, Coursey Springs Fish Cultural Station
Bryan Young	Region 2, Conservation Police Officer